

STATUS REVIEW OF Cypripedium passerinum

U.S. FOREST SERVICE - REGION 1

FLATHEAD AND LEWIS & CLARK NATIONAL FORESTS

MONTANA

Prepared by:

J. Stephen Shelly, Botanist
Montana Natural Heritage Program
State Library Building
1515 E. 6th Avenue
Helena, MT 59620

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I. SPECIES INFORMATION

A. CLASSIFICATION

1. SCIENTIFIC NAME: Cypripedium passerinum Richardson.
2. SYNONYM: Cypripedilum passerinum Pfitz.
3. COMMON NAME: Sparrow's-egg Lady's-slipper.
4. FAMILY: Orchidaceae (Orchid family).
5. GENUS: The genus Cypripedium contains between twenty and thirty species, distributed in temperate and cold regions of North America, Asia, and Europe (Williams and Williams 1983).
6. SPECIES: Cypripedium passerinum is one of ten species in the genus occurring in North America north of Mexico (Williams and Williams 1983). In Montana, it is one of four species reported for the genus; the other species include C. calceolus, C. fasciculatum, and C. montanum (Dorn 1984).

B. PRESENT LEGAL OR OTHER FORMAL STATUS

1. FEDERAL STATUS

- a. U.S. FISH AND WILDLIFE SERVICE: None.
- b. U.S. FOREST SERVICE: Cypripedium passerinum is currently included on the list of sensitive plant species for Region 1 (Northern Region) of the U.S. Forest Service. Agency objectives and policy in the 1984 Forest Service Manual provide for the management and protection of sensitive species (Section 2670.32). Under these guidelines, the U.S. Forest Service is to "(a)void or minimize impacts to species whose viability has been identified as a concern" (2670.32.3).

2. STATE: Cypripedium passerinum is currently listed by the Montana Natural Heritage Program (Shelly 1988) as "imperiled in the state" (state rank = S2). It is listed as "rare" in Montana (limited to a restricted geographic range, or occurring sparsely in restricted habitats over a wider area) by the Montana Rare Plant Project (Lesica *et al.* 1984).

These state ranks do not currently provide any direct legal protection for C. passerinum.

However, through its inclusion on the Region 1 sensitive plant list, the species has legal protection under U.S. Forest Service agency policies (W. Ruediger, pers. comm.).

C. DESCRIPTION

1. GENERAL NONTECHNICAL DESCRIPTION: Cypripedium passerinum is a perennial herb with stems which are mostly about 6-14 inches tall. These occur singly, or more often in clumps of up to 10 or 12 stems. The 3-5 leaves are alternately arranged along the stem, and are about 2-8 inches long, and 1-3 inches wide. The flowers are pale white in color, and are borne singly or in clusters of two or three at the tops of the stems. The lower petal is a distinctive pouch ("slipper") with an opening in the upper surface. This represents the lip petal, a distinguishing feature of the orchid family. The pouch is speckled on the inside with reddish-purple spots, and averages about $\frac{1}{2}$ -1 inch long. In Montana, the plants are generally in flower from mid-June to early July. Fruiting occurs from July into early August. See Section V, p. 46, for color photos of plants and habitat.
2. TECHNICAL DESCRIPTION: Terrestrial, pubescent, herbaceous perennial; stems (1) 1.5-3.5 dm. tall, villose, leafy throughout; leaves 3-5, sessile, ovate-lanceolate, 6-20 cm. long, viscid-villose; flowers usually single (occasionally 2-3), subtended and usually exceeded by a large green bract; sepals green, the upper one broad, rounded to slightly acute, 12-16 (up to 20) mm. long, the lower pair shorter, from united except at the tip to almost distinct (ours); petals white, oblong, rounded, and spreading, about 12-16 mm. long; lip obovate, 12-15 (20) mm. long, white with a few deep reddish-purple spots inside; staminodium petaloid and showy, elliptic-cordate, lobed at the base, white with reddish-purple dots, 4-6 mm. long; ovary subsessile, thick; $2N=20$ (adapted from Hitchcock *et al.* 1969; Williams and Williams 1983).
3. LOCAL FIELD CHARACTERS: Of the four species of Cypripedium reported for Montana, only two have lip petals that are white: C. montanum and C. passerinum. Although the former species was observed frequently during field surveys in the Bob Marshall Wilderness Area, it is easily distinguished by its long, twisted, brownish-

purple sepals; in addition, the lip petal of C. montanum is not spotted inside, although it may have some purple veins at the base. Cypripedium passerinum has short, flattened, greenish sepals, and the lip is speckled with reddish-purple spots inside. The two are also ecologically distinct; C. montanum occurs in dry to fairly moist, open to shaded upland coniferous forests, while C. passerinum occurs in moist seepage areas, riparian zones, and on the margins of sphagnum bogs.

Hitchcock *et al.* (1969) state that the "...plants of Montana are larger-leaved and larger-flowered than those seen from farther north, and their flowers seem to have the lower sepals more nearly distinct."

D. GEOGRAPHICAL DISTRIBUTION

1. RANGE: Cypripedium passerinum is mainly a boreal species, distributed from Alaska and the Yukon east to Quebec and the southern end of Hudson Bay, and extending south to southeastern British Columbia, northwestern Montana, and the Lake Superior region (Hitchcock *et al.* 1969; Williams and Williams 1983). It is "...one of the very few members of the orchid family that grows within the Arctic Circle" (Luer 1975). The species is known to occur on the Flathead and Lewis & Clark national forests, in Region 1 (Northern Region) of the U.S. Forest Service; this is the only area where it is found in the lower 48 United States. The distribution of C. passerinum in Montana is shown in Figure 1, p. 4. The exact locations are indicated on the maps provided in Section IV, pp. 35-45.
2. CURRENT SITES (MONTANA): Cypripedium passerinum is documented from ten sites: one is in Glacier National Park, four are in the Bob Marshall Wilderness Area, and five are in the Front Range mountains east of the wilderness boundary. One additional unverified location has been reported, also in the Front Range mountains. The locations of these sites, including the legal descriptions, latitude and longitude, elevations, and USGS topographic quadrangle names, are provided in Table 1, p. 5. These are subdivided to indicate those sites which occur wholly or partially on U.S. Forest Service lands (Table 1A), and the site which occurs on lands not managed by the U.S. Forest Service (Table 1B). Field surveys were conducted by the author on 20 June-1 July, and 12 July, 1988. Assistance with field research was

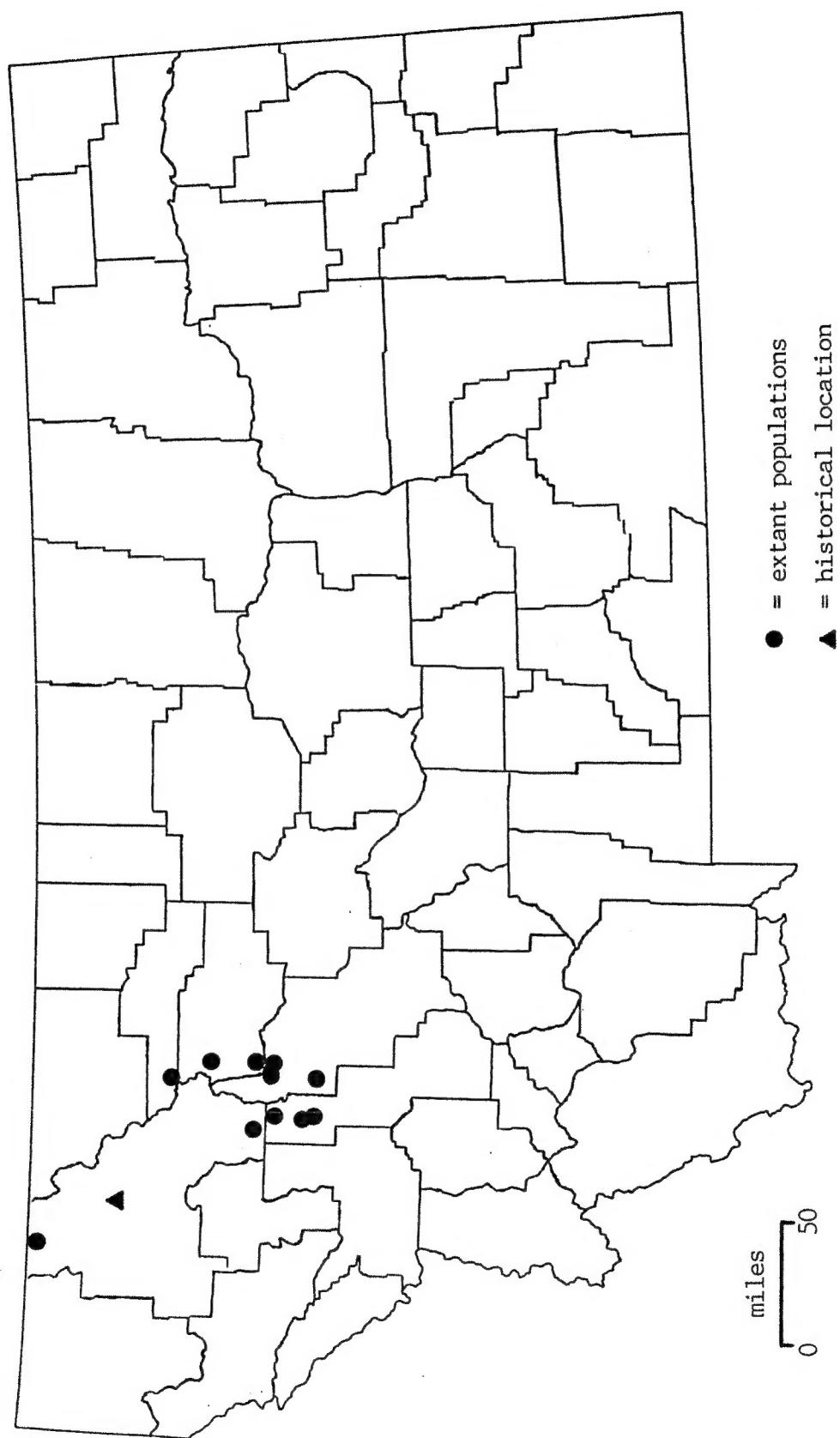


Figure 1. Distribution of Cypripedium passerinum in Montana.

TABLE 1A. Cypripedium passerinum locations wholly or partially occurring on U.S. Forest Service lands, Montana.

Occurrence number: 002

Site name: GREEN TIMBER BASIN

COUNTY: LEWIS & CLARK

Township & Range: 021N009W Section: 15 Subsection/additional sections: W2NW4, 16E2NE4

Latitude: 473441 Longitude: 1124515 Elevation: 5130

USGS Quad: PATRICKS BASIN

Location: ROCKY MOUNTAIN FRONT RANGE, GREEN TIMBER BASIN, CA. 1.7 AIR MILES SOUTH OF GIBSON DAM.

Occurrence number: 003

Site name: BUTCHER MOUNTAIN MEADOWS

COUNTY: POWELL

Township & Range: 020N013W Section: 15 Subsection/additional sections: NW4, SW4NE4, N2SE4

Latitude: 472936 Longitude: 1131422 Elevation: 4740

USGS Quad: PILOT PEAK

Location: BOB MARSHALL WILDERNESS AREA, "BUTCHER MOUNTAIN MEADOWS", 0.3-1.0 MI. WEST OF SOUTH FORK FLATHEAD RIVER, ADJACENT TO BIG PRAIRIE.

Occurrence number: 004

Site name: WHITE RIVER

COUNTY: POWELL

Township & Range: 021N013W Section: 14 Subsection/additional sections: SE4SW4

Latitude: 473410 Longitude: 1131417 Elevation: 4560

USGS Quad: HAYSTACK MOUNTAIN

Location: BOB MARSHALL WILDERNESS AREA, SOUTH SIDE OF WHITE RIVER, 2.15 AIR MILES WSW OF CONFLUENCE OF SOUTH FORK AND MAIN STEM, CA. 3 AIR MILES EAST OF SOUTH FORK FLATHEAD RIVER.

Occurrence number: 005

Site name: MUD LAKE

COUNTY: FLATHEAD

Township & Range: 022N014W Section: 25 Subsection/additional sections: E2

Latitude: 473819 Longitude: 1131953 Elevation: 4360

USGS Quad: PAGODA MOUNTAIN

Location: BOB MARSHALL WILDERNESS AREA, SOUTH FORK FLATHEAD RIVER DRAINAGE, EAST SIDE OF MUD LAKE, CA. 13.5 AIR MILES SSE OF MEADOW CREEK TRAILHEAD.

Occurrence number: 006

Site name: BLACKTAIL GULCH

COUNTY: TETON

Township & Range: 022N009W Section: 28 Subsection/additional sections: SE4

Latitude: 473747 Longitude: 1124526 Elevation: 4960

USGS Quad: ARSENIC MOUNTAIN

Location: ROCKY MOUNTAIN FRONT RANGE, BLACKTAIL GULCH, CA. 1.1 MILES NORTH OF TRAILHEAD ON BLACKTAIL GULCH TRAIL (#223), CA. 2 MILES NORTH OF GIBSON DAM.

TABLE 1A. (cont.).

Occurrence number: 007
 Site name: DRY FORK LANGE CREEK
 COUNTY: LEWIS & CLARK
 Township & Range: 021N010W Section: 12 Subsection/additional sections: E2SE2
 Latitude: 473509 Longitude: 1124919 Elevation: 5700
 USGS Quad: PATRICKS BASIN
 Location: ROCKY MOUNTAIN FRONT RANGE, DRY FORK LANGE CREEK DRAINAGE,
 1.3 AIR MILES SSE OF LANGE FALLS, 0.97 AIR MILES EAST OF
 LANGE CREEK.

Occurrence number: 008
 Site name: BIG PRAIRIE BRIDGE
 COUNTY: POWELL
 Township & Range: 020N013W Section: 10 Subsection/additional sections: NW4
 Latitude: 473021 Longitude: 1131436 Elevation: 4600
 USGS Quad: HAYSTACK MOUNTAIN
 Location: BOB MARSHALL WILDERNESS AREA, SOUTH SIDE OF SOUTH FORK
 FLATHEAD RIVER, JUST WEST OF BIG PRAIRIE PACK BRIDGE.

Occurrence number: 010
 Site name: CLARY COULEE
 COUNTY: TETON
 Township & Range: 025N009W Section: 25 Subsection/additional sections: NE4
 Latitude: 475343 Longitude: 1124210 Elevation: 5600
 USGS Quad: CAVE MOUNTAIN
 Location: ROCKY MOUNTAIN FRONT RANGE, CLARY COULEE, ALONG TRAIL (#177)
 CA. 0.8 MILE NORTH OF NORTH FORK TETON RIVER.

Occurrence number: 011
 Site name: NORTH FORK BIRCH CREEK
 COUNTY: PONDERA
 Township & Range: 028N010W Section: 28 Subsection/additional sections: N2
 Latitude: 480928 Longitude: 1125404 Elevation: 5040
 USGS Quad: SWIFT RESERVOIR
 Location: ROCKY MOUNTAIN FRONT RANGE, NORTH FORK BIRCH CREEK, 0.1 AIR
 MILE SSW. OF CONFLUENCE WITH HAYWOOD CREEK, NEAR WEST END OF
 SWIFT RESERVOIR.

Occurrence number: 012
 Site name: STRAIGHT CREEK
 COUNTY: LEWIS & CLARK
 Township & Range: 020N010W Section: 16 Subsection/additional sections: 34
 Latitude: 472851 Longitude: 1125256 Elevation: 5400
 USGS Quad: BENCHMARK, WOOD LAKE
 Location: ROCKY MOUNTAIN FRONT RANGE, STRAIGHT CREEK, CA. 1/2 MILE OR LESS
 SOUTH OF BENCHMARK TRAILHEAD, AND CA. 3 MILES SOUTH OF TRAILHEAD,
 ON TRAIL #212.

TABLE 1B. Cypripedium passerinum location on lands not managed by the U.S. Forest Service, Montana.

Occurrence number: 001
Site name: KISHENEHN SPRUCE SWAMP
COUNTY: FLATHEAD
Township & Range: 037N021W Section: 07 Subsection/additional sections: SE4
Latitude: 485843 Longitude: 1142209 Elevation: 4200
USGS Quad: KINTLA LAKE
Location: GLACIER NATIONAL PARK, CA. 1 AIR MI. S. OF KISHENEHN CREEK,
0.6 AIR MI. NW. OF STARVATION CREEK, CA. 2.4 AIR MI. NW. OF
KINTLA LAKE.

provided by Angela Evenden, Maria Ash, Wayne Phillips and Dana Field (U.S. Forest Service), Lisa Schassberger (Montana Natural Heritage Program), and Cary Lund.

Throughout this report, the three-digit occurrence numbers are indicated in parentheses after the site names; these correspond to the occurrence numbers provided in the tables and computer print-outs.

3. HISTORICAL SITES (MONTANA): One historical location of C. passerinum is documented by a voucher specimen. This collection was made in 1894, in the vicinity of Columbia Falls (Flathead County). It is unknown whether the species is still extant in this area. The location information is so vague that the record is not mapped on the Natural Heritage Program topographic maps. The existing information is contained in the computer print-out (p. 31, occurrence no. 009).
4. SITES NOT RECENTLY SURVEYED (MONTANA): Cypripedium passerinum has been documented from one site in Glacier National Park. This occurrence was studied by Peter Lesica in 1983. The location, legal description, latitude and longitude, elevation, and USGS topographic quadrangle name for this site is provided in Table 1B, p. 7.
5. UNVERIFIED/UNDOCUMENTED REPORTS (MONTANA): Cypripedium passerinum has been reported in the Straight Creek drainage in the Front Range; a photograph of a plant in late flower was identified by Wayne Phillips (pers. comm.). The exact location is unknown, and the site should be verified in 1989. The existing information is contained in the computer print-out (p. 34, occurrence no. 012).
6. AREAS SURVEYED BUT SPECIES NOT LOCATED: Field surveys on the Lewis & Clark National Forest in 1988 emphasized thorough searches along tributaries of the Sun River in the Front Range. Drainages which were surveyed on foot, but in which no sites for C. passerinum were found, include:
 - a. Cutreef Creek (T21N, R9W, Sections 26, 27, 35, 36).
 - b. Leavitt Creek (T21N, R9W, Sections 8, 17).

- c. Mortimer Gulch (T22N, R9W, Sections 9, 16, 21, 28, 33)
- d. Patricks Basin (downstream along Lange Creek from Stovepipe Creek; T21N, R10W, Sections 11, 13, 14).
- e. Stovepipe Creek (T21N, R10W, Sections 13, 24; T21N, R9W, Section 18).

No suitable habitat, aside from the Mud Lake, White River, and Butcher Mountain Meadow sites in the South Fork Flathead River drainage, was observed in the Bob Marshall Wilderness Area. Moist forests and meadow areas were searched in the vicinity of Big Prairie (lower Cayuse Creek), but no populations were found.

E. HABITAT

1. ASSOCIATED VEGETATION: In Montana, Cypripedium passerinum is found in moist mossy seepage areas, along stream shores, and in the ecotonal margins of sphagnum bogs, often in full or partial shade of coniferous trees. The sites are most typically associated with forests of Picea engelmannii (Engelmann Spruce); in some areas it also occurs with Pinus contorta (Lodgepole Pine). Additional frequently associated plants, which include a large number of other orchid species, include:

Angelica arguta (Sharptooth Angelica)
Carex aurea (Golden Sedge)
Carex dioica (= C. gynocrates; Yellow-bog Sedge)
Carex disperma (Softleaved Sedge)
Carex interior (Inland Sedge)
Corallorrhiza trifida (Yellow Coral-root)
Cornus canadensis (Bunchberry)
Cornus stolonifera (Red Osier Dogwood)
Disporum trachycarpum (Wartberry Fairy-bell)
Equisetum arvense (Field Horsetail)
Equisetum scirpoides (Sedgelike Horsetail)
Galium boreale (Northern Bedstraw)
Habenaria dilatata (White Bog-orchid)
Habenaria hyperborea (Northern Green Bog-orchid)
Habenaria obtusata (Blunt-leaf Rein-orchid)
Ledum glandulosum (Trapper's Tea)
Linnaea borealis (Western Twinflower)
Listera borealis (Northern Twayblade)
Listera convallarioides (Broad-lipped Twayblade)
Mitella nuda (Bare-stemmed Mitrewort)
Orchis rotundifolia (Round-leaved Orchis)
Osmorhiza chilensis (Mountain Sweet-root)

Pyrola uniflora (Woodnymph)
Salix scouleriana (Scouler Willow)
Smilacina stellata (Starry Solomon-plume)
Streptopus amplexifolius (Clasping-leaved Twisted-stalk)
Symporicarpos albus (Common Snowberry)
Thalictrum occidentale (Western Meadowrue)

The co-occurrence of Orchis rotundifolia with C. passerinum at many sites, owing to similar ecological requirements, should be emphasized. Both species are U.S. Forest Service Region 1 sensitive species, and careful management will be needed to protect the following sites where the two species occur together:

Blacktail Gulch (006)
 Butcher Mountain Meadows (003)
 Clary Coulee (010)
 Dry Fork Lange Creek (007)
 Green Timber Basin (002)
 North Fork Birch Creek (011)
 White River (004)

2. TOPOGRAPHY: In Montana, populations of C. passerinum are most often found on gently sloping areas, varying from approximately 0-10% slope. It was found on all aspects.

The known sites in Montana range from 1280 m. (4200 ft.) to 1740 m. (5700 ft.) in elevation.

3. SOIL RELATIONSHIPS: All of the known sites for C. passerinum in Montana occur in areas with calcareous substrates. The soils are typically weathered from beds of the Madison Limestone formation, especially in the Rocky Mountain Front Range (Veseth and Montagne 1980). The most important feature of all known sites appears to be semi-permanent water seepage near the surface. Cypripedium passerinum is often found on moist, mossy hummocks in these seepage zones.

4. REGIONAL CLIMATE: The climate of northwestern Montana west of the Continental Divide can generally be classified as moist and temperate, while the Front Range is more likely to be influenced by cold, dry continental air masses. For the distributional area of C. passerinum in Montana, the nearest climatological stations are located at Gibson Dam (1399 m. (4590 ft.)) and Hungry Horse Dam (963 m. (3160 ft.)). Data for the period 1951-1980 are provided by the U.S. Department of Commerce (1982). At Gibson Dam, the mean annual precipitation was

47.04 cm. (18.52 in.); the mean annual temperature was 5.4°C (41.7°F), the mean January minimum was -11.6°C (11.2°F), and the mean July maximum was 25.5°C (77.9°F). At Hungry Horse Dam, the mean annual precipitation was 85.09 cm. (33.50 in.); the mean annual temperature was 6.1°C (43.0°F), the mean January minimum was -9.7°C (14.6°F), and the mean July maximum was 26.8°C (80.2°F).

F. POPULATION DEMOGRAPHY AND BIOLOGY

1. PHENOLOGY: In Montana, C. passerinum typically begins blooming during the second week of June; peak flowering was observed at the end of the third week in June. Some flowers persist until the first week of July, but the species then goes out of bloom rapidly. Fruiting extends from late June into late July or early August.
2. POPULATION SIZE AND CONDITION: Because C. passerinum is capable of spreading vegetatively, and can give rise to clusters of stems from the same rootstock, it is difficult to meaningfully estimate the number of distinct individuals in the field. Thus, estimates or exact counts of the number of stems were made for the Montana populations observed in 1988. Populations ranged in size from eight to approximately 1200 stems; these contain from one to four subpopulations. The average number of stems per population observed to date is approximately 380; the total number of stems observed in Montana to date is approximately 3000. Two of the four populations in the Bob Marshall Wilderness Area were the largest studied (004, 005), each containing approximately 1200 stems. The smallest sites were in the Front Range, outside the wilderness boundary (002, 006, 007). The smallest of these (Dry Fork Lange Creek (007)) consisted of eight stems in 1988.

Details regarding population size and condition are summarized in Table 2.

3. REPRODUCTIVE BIOLOGY

- a. TYPE OF REPRODUCTION: Two methods of reproduction are known to occur commonly in the Orchidaceae: vegetative spread, and sexual production of seeds (Williams and Williams 1983). Cypripedium passerinum is capable of both types of reproduction.
- b. POLLINATION BIOLOGY: Most orchid species rely on insects, especially members of the Hymenoptera and Lepidoptera, for pollination

TABLE 2. Population size and condition, Cypripedium passerinum, Montana.

Occurrence number: 001

Site name: KISHENEHN SPRUCE SWAMP

Acreage: 2

Population size and condition: CA. 150 STEMS; SITE IS UNDISTURBED EXCEPT FOR A NEARBY, LITTLE-USED TRAIL.

Occurrence number: 002

Site name: GREEN TIMBER BASIN

Acreage: 2

Population size and condition: 160 STEMS COUNTED, 11 FLOWERING; 52 RELOCATED ON 88-08-04 AS LIVE PLANTS, BUT MANY OTHERS HAD BEEN GRAZED OR BROKEN BY TRAMPLING; DRAINAGE WAS PARTIALLY LOGGED IN THE PAST, AND IS CURRENTLY GRAZED DURING MID-LATE SUMMER.

Occurrence number: 003

Site name: BUTCHER MOUNTAIN MEADOWS

Acreage: 15

Population size and condition: 287 STEMS COUNTED, IN 4 SUBPOPULATIONS; EST. 300-350 STEMS TOTAL.

Occurrence number: 004

Site name: WHITE RIVER

Acreage: 4

Population size and condition: CA. 1200 STEMS OBSERVED, IN MANY LARGE CLUSTERS; SOME HABITAT NEAR WEST END OF SITE HAS BEEN INFLUENCED BY A SMALL LANDSLIDE.

Occurrence number: 005

Site name: MUD LAKE

Acreage: 5

Population size and condition: EST. 1000-1200 STEMS, CA. 500-600 INDIVIDUALS; TWO SUBPOPULATIONS, CA. 500-600 STEMS IN EACH; PACK TRAIL TRAVERSES NORTHWEST PORTION OF BOG MEADOW, CA. 0.25 MILES FROM SITE.

Occurrence number: 006

Site name: BLACKTAIL GULCH

Acreage: 2

Population size and condition: CA. 66 STEMS COUNTED (CA. 37 VEGETATIVE, 26 IN FRUIT OR POST-FLOWERING, 3 FLOWERING); AREA APPEARS TO HAVE SLUMPED AROUND SPRING SEEPS.

Occurrence number: 007

Site name: DRY FORK LANGE CREEK

Acreage: 1

Population size and condition: EIGHT STEMS COUNTED (5 FRUITING, 3 VEGETATIVE); HABITAT CURRENTLY UNDISTURBED.

TABLE 2. (cont.).

Occurrence number: 008

Site name: BIG PRAIRIE BRIDGE

Acreage: 1

Population size and condition: CA. 100 STEMS, IN A VERY SMALL STRIP AROUND THE RIVER'S EDGE (A FEW FEET WIDE TO 20 FEET LONG); FLOWERING STEMS INFREQUENT, BUT SITE FOUND LATE IN THE GROWING SEASON.

Occurrence number: 009

Site name: COLUMBIA FALLS

Acreage: 0

Population size and condition: UNKNOWN; SPECIMEN IN FLOWER.

Occurrence number: 010

Site name: CLARY COULEE

Acreage: 2

Population size and condition: 93 STEMS, 33 WITH CAPSULES; TWO SUBPOPULATIONS; SITE IS DIRECTLY ADJACENT TO HIKING TRAIL, AND A PORTION OF THE NORTHERNMOST SEEP HAS BEEN ALTERED BY IT.

Occurrence number: 011

Site name: NORTH FORK BIRCH CREEK

Acreage: 2

Population size and condition: 388 STEMS, 106 WITH CAPSULES; THREE SUBPOPULATIONS; NO GRAZING OCCURRING, BUT SITE IS NEAR TRAIL, WHICH COULD DESTABILIZE SLOPE.

Occurrence number: 012

Site name: STRAIGHT CREEK

Acreage: 0

Population size and condition: CA. 25 PLANTS (NORTH SITE), IN LATE FLOWER AND IMMATURE FRUIT; SIZE OF SOUTHERN POPULATION UNKNOWN.

and subsequent fertilization. In the Orchidaceae, the anthers, containing the pollen grains, are grouped in masses called pollinia. When insects visit the flowers, they come into contact with the viscidium, a sticky disk connected by a stalk to the pollinia. The viscidium adheres to the insect, taking with it the pollinia, which can then be carried on to another flower. However, in cases where a flower is not visited by an insect, the viscidium shrinks as the flower withers, pulling the pollen masses away from the anthers to hang forward above the stigma. Wind movement is then sufficient to bring the pollen into contact with the stigma, and self-pollination is thus achieved (Williams and Williams 1983). It is possible that self-pollination is prevalent in C. passerinum, as no insect visitors were observed during field surveys in 1988.

c. SEED DISPERSAL AND BIOLOGY: Upon maturation of the capsules, the walls split upon drying to release the numerous seeds they contain. The seeds of orchids are very small, and are typically dispersed by wind.

It is well known that most orchids rely on a symbiotic relationship with certain soil fungi (mycorrhizae) for effective seed germination and subsequent growth. If the necessary mycorrhizal fungi are lacking at a particular site, it is not likely that a species such as C. passerinum could become established there. Currently, some aspects of this relationship are being studied by Ales Suchomel, a botany student at the University of Montana. Specifically, his study will include the sowing of seeds onto artificially fungi-enriched substrates in the field, in sites which appear to be suitable habitat but which do not currently support the species. Comparisons with germination results on artificial media will be made.

G. POPULATION ECOLOGY

1. BIOLOGICAL INTERACTIONS

a. COMPETITION: Owing to its specialized habitat, C. passerinum would not possess strong competitive ability in other more densely vegetated areas to which it is not ecologically adapted. However, within the microhabitats

where it does occur, individuals are often found on small hummocks where cover of other herbaceous vegetation is fairly high; these sites are also often at least partially shaded by overhanging shrub and tree species. Thus, it appears that, within its own habitat, the species has some tolerance for interspecific competition.

b. HERBIVORY: Field observations during 1988 did not indicate that C. passerinum is subject to heavy browsing by native herbivores. However, the Green Timber Basin (002) site is subject to livestock grazing each summer beginning in early July, and the area is moderately to heavily grazed. During surveys and establishment of a monitoring study by Dana Field (U.S. Forest Service) in 1988, 160 stems were observed on 11 July; on 4 August, only 52 live stems could be relocated, and many of the other plants had been bitten off or broken by grazing and trampling. The long-term effects of this activity should be closely monitored, to determine population trends.

H. LAND OWNERSHIP

1. The land ownership for the eleven occurrences currently known in Montana is given below. The exact locations are provided in Table 1, pp. 5-7.

a. U.S. FOREST SERVICE:

- i. Flathead National Forest, Spotted Bear Ranger District, Bob Marshall Wilderness Area:

Butcher Mountain Meadows (003)
White River (004)
Mud Lake (005)
Big Prairie Bridge (008)

- ii. Lewis & Clark National Forest, Rocky Mountain Ranger District:

Green Timber Basin (002)
Blacktail Gulch (006)
Dry Fork Lange Creek (007)
Clary Coulee (010)
North Fork Birch Creek (011)
Straight Creek (012; unverified)

b. U.S. DEPARTMENT OF INTERIOR:

i. National Park Service, Glacier National Park:

Kishenehn Spruce Swamp (001)

c. CURRENT STATUS UNKNOWN:

Columbia Falls (009; historical record)

II. ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

A. THREATS TO CURRENTLY KNOWN POPULATIONS (MONTANA): Based on field observations in 1986 and 1988, populations of Cypripedium passerinum are potentially or currently threatened by i) grazing, ii) recreational activities, and iii) timber harvesting. The sites threatened by these activities are reviewed below:

1. GRAZING: The site that is currently being most impacted by livestock grazing is Green Timber Basin (002), on the Lewis & Clark National Forest. Cattle are turned into the area around 1 July each year, and they concentrate in the basin area in the old clear-cuts, as well as the forests in which Cypripedium passerinum mainly occurs. As discussed in Section I.G.1.b., grazing may be impacting this population.

Two other sites in the Front Range, on the Lewis & Clark National Forest, are in areas which may be subject to grazing, but they do not currently appear to be threatened by this activity:

Blacktail Gulch (006)
Dry Fork Lange Creek (007)

2. RECREATIONAL ACTIVITIES: Four populations studied in 1988 occur in the Bob Marshall Wilderness Area:

Butcher Mountain Meadows (003)
White River (004)
Mud Lake (005)
Big Prairie Bridge (008)

None of these four sites appear to be seriously threatened by recreational use at this time, although the following observations were made. The Butcher Mountain Meadows area is lightly used by outfitters for hunting in the fall, well after the growing season (Maria Ash, pers. comm.); the Butcher Mountain trail (#133) does bisect the area, but it

is lightly-used, and does not pass within the immediate area of the bog meadows or the orchid subpopulations. If the meadows or adjacent forests were to be used for hunting camps, some impacts might occur.

The White River site is along the south side of the river, adjacent to a trail which is no longer maintained; the current White River trail (#112) follows the north side. However, the south trail is still used occasionally by outfitters and U.S.F.S. personnel; it is becoming more difficult to use, because landslides have removed portions of the trail near the C. passerinum site. Although a portion of the habitat near the west end of the site may have been impacted by these slides, the majority of the riverbank habitat is intact and not easily accessible.

The Mud Lake site occurs on the east side of the lake, in the ecotone between the bog mat and the adjacent forest. The northwest portion of the meadow associated with Mud Lake is traversed by the main South Fork Flathead River pack trail (#80), which is heavily used. The trail is actually about 0.4 km. from the nearest portion of the C. passerinum population, and the immediate site does not appear to be impacted at this time.

The Big Prairie Bridge site is on the shore of the South Fork Flathead River, just west of the large wooden pack bridge over the river. Although a maintained trail does not follow the immediate shore of the river here, the area is used for fishing, and may occasionally be traversed on foot.

In the Front Range, three populations (Blacktail Gulch (006), Clary Coulee (010), and North Fork Birch Creek (011)) are located near maintained trails. In Blacktail Gulch, the trail (#223) is a National Recreation Trail, and is fairly heavily used for hiking and horseback riding. The C. passerinum population is located along the east side of the trail about 1 mile north of the trailhead. Although it is directly adjacent to the trail, the site does not appear to be impacted at this time. The boggy seepage area is not easily traversed, and is thus not likely to be heavily impacted by trail use in the current situation. In Clary Coulee, the northernmost subpopulation of C. passerinum is partially traversed by a hiking trail (#177). The trail is steep, and eroded in places to 3-5 m. wide (D. Field, U.S. Forest Service). Trail relocation

may eventually be necessary here, to protect the seepage area. At the North Fork Birch Creek site, a hiking trail (#105) traverses all three seepage areas which contain C. passerinum, and could eventually lead to destabilization of the slope (D. Field, U.S. Forest Service).

The reported occurrence along Straight Creek (012) apparently consists of subpopulations that are close to the hiking trail (#212). The full extent of this occurrence, and the potential impacts from trail use, need to be more fully documented.

3. **TIMBER HARVESTING:** The only population known to have been impacted by timber harvest activity is the Green Timber Basin (002) site. In this area, some clearcutting has occurred adjacent to the existing orchid site, and it is possible that the population was partially removed by this activity. The forest which currently contains the population was selectively logged, and some direct impacts to individuals probably occurred as a result.

The two other sites in the Front Range, outside the Bob Marshall Wilderness Area, which could potentially be impacted by timber harvesting include Blacktail Gulch (006) and Dry Fork Lange Creek (007). However, it did not appear that such activities are imminent.

- B. **MANAGEMENT PRACTICES AND RESPONSE:** Little detailed information exists regarding the response of C. passerinum to management practices such as grazing and timber harvesting. Owing to its specialized habitats and complex obligate interactions with soil mycorrhizal fungi, it is not likely that the species would respond favorably to such activities. Although the population in Green Timber Basin contained a maximum of 160 stems in 1988, it was probably larger in the past. Ecodata studies recently established at this location will be useful in obtaining a more detailed understanding of the species' response to disturbance.

- C. **RECOMMENDATIONS FOR MAINTAINING VIABLE POPULATIONS:** The following recommendations are made to insure the long-term persistence of viable populations of C. passerinum on U.S. Forest Service lands in Montana:

1. Protection of natural habitats which currently support populations. Although afforded some degree of protection by wilderness designation, the four populations in the Bob Marshall Wilderness Area should be considered in any proposed recreational developments which may occur in the vicinity of the

known sites. The Butcher Mountain Meadows (003) and White River (004) populations are the largest known in Montana, and protection of these sites will be a very important part of maintaining viable populations in Region 1. Management plans on the Lewis & Clark National Forest should also take into consideration all known populations, especially Green Timber Basin (002), Blacktail Gulch (006), Clary Coulee (010), and North Fork Birch Creek (011); although very small, the Dry Fork Lange Creek (007) site should also be considered in future planning. Further information is needed for the occurrence reported in Straight Creek (012) before recommendations can be made.

2. Notification of U.S. Forest Service personnel of locations on U.S.F.S. lands. To prevent inadvertent impacts to known populations, all appropriate personnel involved in planning should be provided with detailed location information for *C. passerinum*. It is especially important that Ranger District timber sale managers, engineers, and range conservationists know the precise locations, so that disturbance may be prevented.

D. RECOMMENDATIONS FOR FURTHER ASSESSMENT

1. Further surveys in potential habitats. Further field surveys may reveal the existence of additional populations in Montana, especially in the Front Range and Glacier National Park. Drainages in the Front Range which contain seepage zones in *Picea engelmannii* forest types are particularly likely to support additional sites. Especially promising would be further surveys in the North Fork Birch Creek drainage, upstream from the known site. The reported occurrence in the Straight Creek drainage should be verified, and its full extent determined. Searches along the shores of the South Fork Flathead River, in the Bob Marshall Wilderness Area, might also be revealing.
2. Establishment of monitoring studies to assess population condition and status. In order to more accurately determine the effects of habitat alteration on populations of *C. passerinum*, monitoring studies should be established in several locations, especially at Green Timber Basin (002) and North Fork Birch Creek (011) (note: ecodata plots were established at these sites in 1988). Similar studies, if established in one of the large populations in the Bob Marshall Wilderness Area, would provide useful comparisons. The method outlined by Lesica (1987) is a good one for

obtaining data on both demographic trends and reproductive success, and could perhaps be combined with the ecodata plot studies.

3. Cooperation in the seed germination studies being conducted. As discussed in Section I.F.3.c., seed germination ecology studies are being carried out by Ales Suchomel, a botany student at the University of Montana. These studies, in addition to providing important ecological data, will be useful in determining procedures for establishing populations in unoccupied habitat, should the need arise.

- E. **SUMMARY:** *Cypripedium passerinum* is an orchid species distributed broadly across boreal North America. It extends southward to northwestern Montana, where it has been found on the Flathead and Lewis & Clark national forests. The occurrences in Montana are the only ones known in the lower 48 United States, and include the southernmost localities known globally. It is currently listed as a sensitive species in Region 1 of the U.S. Forest Service. There are presently ten verified sites in Montana, nine of these occurring on national forest lands; there is also one unverified report on the Lewis & Clark National Forest. During field surveys on U.S. Forest Service lands in 1988, three previously known locations were verified, and six new occurrences were found. The two largest populations known in Montana were found in the Bob Marshall Wilderness Area. The smallest populations, which are also the most vulnerable to disturbance, are found in the Rocky Mountain Front Range. Owing to specialized habitat requirements and obligate relationships with soil fungi, the species does not appear to be one that would tolerate any severe habitat alteration. Management planning should take all Montana sites into consideration, in order to maintain viable populations on Region 1 lands.

III. LITERATURE CITED

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IV. ELEMENT OCCURRENCE PRINT-OUTS AND MAPS (PP. 23-45)

ELEMENT OCCURRENCE RECORD

EOCODE: PMORC0Q0A0.001
 NAME: CYPRIPEDIUM PASSERINUM
 COMNAME: SPARROW'S-EGG LADY'S-SLIPPER
 MARGNUM: 1 TENTEN: 1,2 IDENT: Y EORANK:
 SURVEYSITE: KISHENEHN SPRUCE SWAMP
 EORANKCOMM:
 SURVEYDATE: 1983-07-01 LASTOBS: 1983-07-01 FIRSTOBS: 1983 GRANK: 6465
 SRANK: S2 STATE: MT COUNTYNAME: MTFLAT
 QUADCODE: 4811483
 QUADNAME: KINTLA LAKE PRECISION: SC
 LAT: 485843 LONG: 1142209 S: 0 N: 0 E: 0 W: 0
 TOWNRANGE: 037N021W SECTION: 07 MERIDIAN: PR TRSCOMM: SE4
 PHYSPROV: NR WATERSHED: 17010206 RIVERREACH:
 DIRECTIONS: GLACIER NATIONAL PARK, CA. 1 AIR MI. S. OF KISHENEHN CREEK,
 0.6 AIR MI. NW. OF STARVATION CREEK, CA. 2.4 AIR MI. NW. OF
 KINTLA LAKE.
 GENDESC: SPRUCE SWAMP WITH HUMMOCKS AND HOLLOWs, WITH STANDING WATER
 IN THE HOLLOWs, AND ELEMENT & OTHER VEGETATION ON HUMMOCKS;
 SEEPEY AREA, PROBABLY CALCAREOUS (CONT.).
 ELEV: 4200 SIZE: 2
 EODATA: CA. 150 STEMS; GENDESC. (CONT.): WITH PICEA ENGELMANNII,
 POPULUS TRICHOCARPA, SALIX SP., CORNUs STOLONIFERA,
 EQUISETUM ARVENSE, VIOLA NEPHROPHYLLO; SITE IS UNDISTURBED
 EXCEPT FOR A NEARBY, LITTLE-USED TRAIL.
 COMMENTS: VOUCHER-DeSANTO, J., 1980, GNP.

 MACODE1: FNPNPGLAC1MTUS CONTAINED1: Y MACODE2: CONTAINED2:

 MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
 MOREMGMT: F SITECODE:
 SITENAME:
 OWNER: GLACIER NATIONAL PARK
 OWNERCOMM:
 PROTCOMM:
 MGMTCOMM:
 MONITOR: MONITORNUM: -
 BESTSOURCE: LESICA, PETER. DIV. OF BIOLOGY, UNIV. OF MONTANA, MISSOULA,
 MT 59812.
 SOURCECODE: PNDLES01MTUS S80DESGPMTUS

 DATASENS: N BOUNDARIES: N PHOTOS: N OWNERINFO:
 TRANSCRIER: 86-04-08 JSS CDREV: Y MAPPER: 86-04-08 JSS QC: Y
 UPDATE: 88-11-22 JSS

ELEMENT OCCURRENCE RECORD

EOCODE: PMORC00A0.002
 NAME: CYPRIPEDIUM PASSERINUM
 COMNAME: SPARROW'S-EGG LADY'S-SLIPPER
 MARGNUM: 3 TENTEN: 10,4 IDENT: Y EORANK: BC
 SURVEYSITE: GREEN TIMBER BASIN
 EORANKCOMM: MODERATE-SIZED POPULATION, IN PARTIALLY DISTURBED HABITAT.
 SURVEYDATE: 1988-07-11 LASTOBS: 1988-08-04 FIRSTOBS: 1948 GRANK: G4G5
 SRANK: S2 STATE: MT COUNTYNAME: MTLEWI
 QUADCODE: 4711257
 QUADNAME: PATRICKS BASIN PRECISION: SC
 LAT: 473441 LONG: 1124515 S: 0 N: 0 E: 0 W: 0
 TOWNRANGE: 021N009W SECTION: 15 MERIDIAN: PR TRSCOMM: W2NW4,16E2NE
 4
 PHYSPROV: NR WATERSHED: 10030104 RIVERREACH:
 DIRECTIONS: ROCKY MOUNTAIN FRONT RANGE, GREEN TIMBER BASIN, CA. 1.7 AIR
 MILES SOUTH OF GIBSON DAM.
 GENDESC: MOIST, WELL-DRAINED HUMMOCKS AND EDGES OF COLD, CALCAREOUS
 SEEPS, UNDER SHADE OF YOUNG SPRUCE; W/ ORCHIS ROTUNDIFOLIA,
 LISTERA BOREALIS, EQUISETUM SCIRPOIDES, PYROLA UNIFLORA.
 ELEV: 5130 SIZE: 2
 EODATA: 160 STEMS COUNTED, 11 FLOWERING; 52 RELOCATED ON 88-08-04 AS
 LIVE PLANTS, BUT MANY OTHERS HAD BEEN GRAZED OR BROKEN BY
 TRAMPLING; DRAINAGE WAS PARTIALLY LOGGED IN THE PAST, AND IS
 CURRENTLY GRAZED DURING MID-LATE SUMMER.
 COMMENTS: VOUCHERS - MEHRHOFF, L.A. (7845), 1978, MONTU; HITCHCOCK &
 MUHLICK (18021), 1948, RM (218800), WTU.
 MACODE1: FFSPLGREE1MTUS CONTAINED1: Y MACODE2: FFSNFLEWI9MTUS CONTAINED2:
 Y
 MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
 MOREMGMT: F SITECODE:
 SITENAME:
 OWNER: LEWIS & CLARK NATIONAL FOREST
 OWNERCOMM:
 PROTCOMM: GREEN TIMBER BASIN-BEAVER CREEK PROPOSED NNL
 MGMTCOMM:
 MONITOR: MONITORNUM: -
 BESTSOURCE: FIELD, DANA.
 SOURCECODE: PNDFIE01MTUS PND SHE01MTUS PNDJOH01MTUS F88SHE05MTUS PNDPHI01MTUS
 F86SHE07MTUS S78MEHUMMTUS PNDPIE01MTUS
 DATASENS: N BOUNDARIES: Y PHOTOS: N OWNERINFO:
 TRANSCRIBR: 86-04-30 JSS CDREV: Y MAPPER: 86-04-30 JSS QC: Y
 UPDATE: 88-11-22 JSS

ELEMENT OCCURRENCE RECORD

EOCODE: PMORC0Q0A0.003
 NAME: CYPRIPEDIUM PASSERINUM
 COMNAME: SPARROW'S-EGG LADY'S-SLIPPER
 MARGNUM: 2 TENTEN: 1,1 IDENT: Y EORANK: A
 SURVEYSITE: BUTCHER MOUNTAIN MEADOWS
 EORANKCOMM: FAIRLY LARGE POPULATION, EXCELLENT HABITAT.
 SURVEYDATE: 1988-06-22 LASTOBS: 1988-06-22 FIRSTOBS: 1986 GRANK: G4G5
 SRANK: S2 STATE: MT COUNTYNAME: MTPOWE
 QUADCODE: 4711342
 QUADNAME: PILOT PEAK PRECISION: SC
 LAT: 472936 LONG: 1131422 S: 472917 N: 472948 E: 1131401 W: 1131446
 TOWNRANGE: 020N013W SECTION: 15 MERIDIAN: PR TRSCOMM: NW4,SW4NE4,N
 2SE4
 PHYSPROV: NR WATERSHED: 17010209 RIVERREACH: 1701020908500.00
 DIRECTIONS: BOB MARSHALL WILDERNESS AREA, "BUTCHER MOUNTAIN MEADOWS",
 0.3-1.0 MI. WEST OF SOUTH FORK FLATHEAD RIVER, ADJACENT TO
 BIG PRAIRIE.
 GENDESC: MOIST, MOSSY AREAS ON EDGES OF BOGS; UNDER PICEA
 ENGELMANNII, AND IN MORE OPEN SALIX AND LEDUM GLANDULOSUM
 SHRUB; WITH ORCHIS ROTUNDIFOLIA, EQUISETUM ARVENSE, (CONT.)
 ELEV: 4740 SIZE: 15
 EODATA: 287 STEMS COUNTED, IN 4 SUBPOPULATIONS; EST. 300-350 STEMS
 TOTAL.
 GENDESC (CONT.): HABENARIA OBTUSATA, STREPTOPUS
 AMPLEXIFOLIUS, CAREX AUREA, MITELLA NUDA, SMILACINA.
 COMMENTS: VOUCHER-SHELLY, J.S. (1467), M. ASH & A. EVENDEN, 1988,
 MONTU.
 MACODE1: FFSWABOBM1MTUS CONTAINED1: Y MACODE2: FFSNFFLAT4MTUS CONTAINED2:
 Y
 MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
 MOREMGMT: F SITECODE:
 SITENAME:
 OWNER: FLATHEAD NATIONAL FOREST
 OWNERCOMM:
 PROTCOMM:
 MGMTCOMM:
 MONITOR: MONITORNUM:
 BESTSOURCE: SHELLY, J.S. 1988. FIELD SURVEYS IN BOB MARSHALL WILDERNESS
 AREA OF 20-26 JUNE.
 SOURCECODE: F88SHE04MTUS PNDSHE01MTUS PNDASH01MTUS PNDEVE01MTUS S88SHEUMMTUS
 DATASENS: N BOUNDARIES: Y PHOTOS: Y OWNERINFO:
 TRANSCRIBR: 87-07-20 JEG CDREV: Y MAPPER: 87-07-23 JEG QC: Y
 UPDATE: 88-11-22 JSS

ELEMENT OCCURRENCE RECORD

EOCODE: PMORC00A0.004
 NAME: CYPRIPEDIUM PASSERINUM
 COMNAME: SPARROW'S-EGG LADY'S-SLIPPER
 MARGNUM: 1 TENTEN: 1,5 IDENT: Y EORANK: A
 SURVEYSITE: WHITE RIVER
 EORANKCOMM: LARGE POPULATION, IN REMOTE UNDISTURBED AREA.
 SURVEYDATE: 1988-06-23 LASTOBS: 1988-06-23 FIRSTOBS: 1949 GRANK: G4G5
 SRANK: S2 STATE: MT COUNTYNAME: MTPOWE
 QUADCODE: 4711352
 QUADNAME: HAYSTACK MOUNTAIN PRECISION: SC
 LAT: 473410 LONG: 1131417 S: 473408 N: 473412 E: 1131412 W: 1131430
 TOWNRANGE: 021N013W SECTION: 14 MERIDIAN: PR TRSCOMM: SE4SW4

 PHYSPROV: NR WATERSHED: 17010209 RIVERREACH: 1701020911400.00
 DIRECTIONS: BOB MARSHALL WILDERNESS AREA, SOUTH SIDE OF WHITE RIVER,
 2.15 AIR MILES WSW OF CONFLUENCE OF SOUTH FORK AND MAIN
 STEM, CA. 3 AIR MILES EAST OF SOUTH FORK FLATHEAD RIVER.
 GENDESC: SHADED TO OPEN BANK ALONG RIVER, IN MOIST MOSSY AREAS; WITH
 PICEA ENGELMANNII, EQUISETUM ARVENSE, HABENARIA HYPERBOREA,
 LINNAEA BOREALIS, ORCHIS ROTUNDIFOLIA, PYROLA UNIFLORA.
 ELEV: 4560 SIZE: 4
 EODATA: CA. 1200 STEMS OBSERVED, IN MANY LARGE CLUSTERS; SOME
 HABITAT NEAR WEST END OF SITE HAS BEEN INFLUENCED BY A
 SMALL LANDSLIDE.

 COMMENTS: VOUCHER-SHELLY, J.S. (1477), A. EVENDEN, & M. ASH, 1988,
 MONTU; PROBABLE RELOCATION OF 1949 SITING (SEE GMF, EF).
 MACODE1: FFSWABOBM1MTUS CONTAINED1: Y MACODE2: FFSNFFLAT4MTUS CONTAINED2:
 Y
 MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
 MOREMGMT: F SITECODE:
 SITENAME:
 OWNER: FLATHEAD NATIONAL FOREST
 OWNERCOMM:
 PROTCOMM:
 MGMTCOMM:
 MONITOR: MONITORNUM:
 BESTSOURCE: SHELLY, J.S. 1988. FIELD SURVEYS IN BOB MARSHALL WILDERNESS
 AREA OF 20-26 JUNE.
 SOURCECODE: F88SHE04MTUS PNDSHE01MTUS PNDEVE01MTUS PNDASH01MTUS S88SHEUMMTUS
 U74KRA01MTUS
 DATASENS: N BOUNDARIES: Y PHOTOS: Y OWNERINFO:
 TRANSCRIBR: 88-08-08 JSS CDREV: Y MAPPER: 88-08-08 JSS QC: Y
 UPDATE: 88-11-22 JSS

ELEMENT OCCURRENCE RECORD

EOCODE: PMORC0Q0A0.005
 NAME: CYPRIPEDIUM PASSERINUM
 COMNAME: SPARROW'S-EGG LADY'S-SLIPPER
 MARGNUM: 1 TENTEN: 4,9 IDENT: Y EDRANK: A
 SURVEYSITE: MUD LAKE
 EORANKCOMM: EXCELLENT LARGE POPULATION, VIRTUALLY UNDISTURBED HABITAT.
 SURVEYDATE: 1988-06-21 LASTOBS: 1988-06-21 FIRSTOBS: 1988 GRANK: G4G5
 SRANK: S2 STATE: MT COUNTYNAME: MTFLAT
 QUADCODE: 4711363
 QUADNAME: PAGODA MOUNTAIN PRECISION: SC
 LAT: 473819 LONG: 1131953 S: 473759 N: 473822 E: 1131952 W: 1131958
 TOWNRANGE: 022N014W SECTION: 25 MERIDIAN: PR TRSCOMM: E2
 PHYSPROV: NR WATERSHED: 17010209 RIVERREACH: 1701020906800.00
 DIRECTIONS: BOB MARSHALL WILDERNESS AREA, SOUTH FORK FLATHEAD RIVER
 DRAINAGE, EAST SIDE OF MUD LAKE, CA. 13.5 AIR MILES SSE OF
 MEADOW CREEK TRAILHEAD.
 GENDESC: MARGIN OF PICEA ENGELMANNII/EQUISETUM ARVENSE FOREST TYPE,
 IN ECOTONE WITH BOG MEADOW; WITH MITELLA NUDA, CAREX AUREA,
 CORNUS CANADENSIS, HABENARIA spp.
 ELEV: 4360 SIZE: 5
 EODATA: EST. 1000-1200 STEMS, CA. 500-600 INDIVIDUALS; TWO
 SUBPOPULATIONS, CA. 500-600 STEMS IN EACH; PACK TRAIL
 TRAVERSES NORTHWEST PORTION OF BOG MEADOW, CA. 0.25 MILES
 FROM SITE.
 COMMENTS: VOUCHER - SHELLY, J.S. (1449), M. ASH AND A. EVENDEN, 1988,
 MONTU.
 MACODE1: FFSWAB0BM1MTUS CONTAINED1: Y MACODE2: FFSNFFLAT4MTUS CONTAINED2:
 Y
 MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
 MOREMGMT: F SITECODE:
 SITENAME:
 OWNER: FLATHEAD NATIONAL FOREST
 OWNERCOMM:
 PROTCOMM:
 MGMTCOMM:
 MONITOR: MONITORNUM:
 BESTSOURCE: SHELLY, J.S. 1988. FIELD SURVEYS IN BOB MARSHALL WILDERNESS
 AREA OF 20-26 JUNE.
 SOURCECODE: F88SHE04MTUS PNDSHE01MTUS PNDEVE01MTUS PNDASH01MTUS S88SHEUMMTUS
 DATASENS: N BOUNDARIES: Y PHOTOS: Y OWNERINFO:
 TRANSCRIBR: 88-07-25 JSS CDREV: Y MAPPER: 88-07-25 JSS QC: Y
 UPDATE: 88-11-22 JSS

ELEMENT OCCURRENCE RECORD

EOCODE: PMORC000A0.006
 NAME: CYPRIPEDIUM PASSERINUM
 COMNAME: SPARROW'S-EGG LADY'S-SLIPPER
 MARGNUM: 2 TENTEN: 10,10 IDENT: Y EORANK: B
 SURVEYSITE: BLACKTAIL GULCH
 EORANKCOMM: FAIRLY SMALL POPULATION, BUT HABITAT RELATIVELY SECURE.
 SURVEYDATE: 1988-06-29 LASTOBS: 1988-06-29 FIRSTOBS: 1988 GRANK: 6465
 SRANK: S2 STATE: MT COUNTYNAME: MTTETO
 QUADCODE: 4711267
 QUADNAME: ARSENIC MOUNTAIN PRECISION: S
 LAT: 473747 LONG: 1124526 S: 0 N: 0 E: 0 W: 0
 TOWNRANGE: 022N009W SECTION: 28 MERIDIAN: PR TRSCOMM: SE4
 PHYSPROV: NR WATERSHED: 10030104 RIVERREACH: 1003010401900.00
 DIRECTIONS: ROCKY MOUNTAIN FRONT RANGE, BLACKTAIL GULCH, CA. 1.1 MILES
 NORTH OF TRAILHEAD ON BLACKTAIL GULCH TRAIL (#223), CA. 2
 MILES NORTH OF GIBSON DAM.
 GENDESC: IN MOSSY SEEPAGE AREA; PICEA ENGELMANNII/EQUISETUM ARVENSE
 HABITAT, WITH PYROLA UNIFLORA, EQUISETUM SCIRPOIDES, SALIX
 SCOULERIANA, MITELLA NUDA.
 ELEV: 4960 SIZE: 2
 EODATA: CA. 66 STEMS COUNTED (CA. 37 VEGETATIVE, 26 IN FRUIT OR
 POST-FLOWERING, 3 FLOWERING); AREA APPEARS TO HAVE SLUMPED
 AROUND SPRING SEEPS.
 COMMENTS: VOUCHER - SHELLY, J.S. (1481), 1988, MONTU.
 MACODE1: FFSNFLEWI9MTUS CONTAINED1: Y MACODE2: CONTAINED2:
 MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
 MOREMGMT: F SITECODE:
 SITENAME:
 OWNER: LEWIS & CLARK NATIONAL FOREST
 OWNERCOMM:
 PROTCOMM:
 MGMTCOMM:
 MONITOR: MONITORNUM:
 BESTSOURCE: SHELLY, J.S. 1988. FIELD SURVEYS IN ROCKY MOUNTAIN FRONT
 RANGE OF 27 JUNE - 1 JULY AND 12 JULY.
 SOURCECODE: F88SHE05MTUS PNDHSHE01MTUS S88SHEUMMTUS
 DATASENS: N BOUNDARIES: Y PHOTOS: N OWNERINFO:
 TRANSCRIBR: 88-08-12 JSS CDREV: Y MAPPER: 88-08-12 JSS QC: Y
 UPDATE: 88-11-22 JSS

ELEMENT OCCURRENCE RECORD

EOCODE: PMORC0Q0A0.007
 NAME: CYPRIPEDIUM PASSERINUM
 COMNAME: SPARROW'S-EGG LADY'S-SLIPPER
 MARGNUM: 5 TENTEN: 5,4 IDENT: Y EORANK: CD
 SURVEYSITE: DRY FORK LANGE CREEK
 EORANKCOMM: VERY SMALL POPULATION; REMOTE UNDISTURBED HABITAT.
 SURVEYDATE: 1988-06-30 LASTOBS: 1988-06-30 FIRSTOBS: 1988 GRANK: G4G5
 SRANK: S2 STATE: MT COUNTYNAME: MTLEWI
 QUADCODE: 4711257
 QUADNAME: PATRICKS BASIN PRECISION: SC
 LAT: 473509 LONG: 1124919 S: 0 N: 0 E: 0 W: 0
 TOWNRANGE: 021N010W SECTION: 12 MERIDIAN: PR TRSCOMM: E2SE2
 PHYSPROV: NR WATERSHED: 10030104 RIVERREACH: 1003010402100.00
 DIRECTIONS: ROCKY MOUNTAIN FRONT RANGE, DRY FORK LANGE CREEK DRAINAGE,
 1.3 AIR MILES SSE OF LANGE FALLS, 0.97 AIR MILES EAST OF
 LANGE CREEK.
 GENDESC: ADJACENT TO SEEPAGE AREA IN FOREST OPENING; WITH PICEA
 ENGELMANNII, EQUISETUM ARVENSE, HABENARIA HYPERBOREA, ORCHIS
 ROTUNDIFOLIA, PYROLA UNIFLORA, EQUISETUM SCIRPOIDES.
 ELEV: 5700 SIZE: 1
 EODATA: EIGHT STEMS COUNTED (5 FRUITING, 3 VEGETATIVE); HABITAT
 CURRENTLY UNDISTURBED.

 COMMENTS: SIGHT RECORD, NO VOUCHER SPECIMEN COLLECTED.

 MACODE1: FFSNFLEWI9MTUS CONTAINED1: Y MACODE2: CONTAINED2:

 MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
 MOREMGMT: F SITECODE:
 SITENAME:
 OWNER: LEWIS & CLARK NATIONAL FOREST
 OWNERCOMM:
 PROTCOMM:
 MGMTCOMM:
 MONITOR: MONITORNUM:
 BESTSOURCE: SHELLY, J.S. 1988. FIELD SURVEYS IN ROCKY MOUNTAIN FRONT
 RANGE OF 27 JUNE - 1 JULY & 12 JULY.
 SOURCECODE: F88SHE05MTUS PND SHE01MTUS S88SHEUMMTUS PND FIE01MTUS

 DATASENS: N BOUNDARIES: Y PHOTOS: Y OWNERINFO:
 TRANSCRIBR: 88-08-23 JSS CDREV: Y MAPPER: 88-08-23 JSS QC: Y
 UPDATE: 88-11-22 JSS

ELEMENT OCCURRENCE RECORD

EOCODE: PMORC0Q0A0.008
 NAME: CYPRIPEDIUM PASSERINUM
 COMNAME: SPARROW'S-EGG LADY'S-SLIPPER
 MARGNUM: 3 TENTEN: 1,10 IDENT: Y EORANK: B
 SURVEYSITE: BIG PRAIRIE BRIDGE
 EORANKCOMM: SMALL POPULATION, SITE NOT HEAVILY IMPACTED.
 SURVEYDATE: 1988-07-26 LASTOBS: 1988-07-26 FIRSTOBS: 1988 GRANK: 6465
 SRANK: S2 STATE: MT COUNTYNAME: MTPOWE
 QUADCODE: 4711352
 QUADNAME: HAYSTACK MOUNTAIN PRECISION: SC
 LAT: 473021 LONG: 1131436 S: 0 N: 0 E: 0 W: 0
 TOWNRANGE: 020N013W SECTION: 10 MERIDIAN: PR TRSCOMM: NW4
 PHYSPROV: NR WATERSHED: 17010209 RIVERREACH: 1701020908500.00
 DIRECTIONS: BOB MARSHALL WILDERNESS AREA, SOUTH SIDE OF SOUTH FORK
 FLATHEAD RIVER, JUST WEST OF BIG PRAIRIE PACK BRIDGE.
 GENDESC: RIVER BANK; WITH EQUISETUM ARVENSE, ALNUS SINUATA, PICEA
 ENGELMANNII.
 ELEV: 4600 SIZE: 1
 EODATA: CA. 100 STEMS, IN A VERY SMALL STRIP AROUND THE RIVER'S
 EDGE (A FEW FEET WIDE TO 20 FEET LONG); FLOWERING STEMS
 INFREQUENT, BUT SITE FOUND LATE IN THE GROWING SEASON.
 COMMENTS: SIGHT RECORD.
 MACODE1: FFSWA80BM1MTUS CONTAINED1: Y MACODE2: FFSNFFLAT4MTUS CONTAINED2:
 Y
 MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
 MOREMGMT: F SITECODE:
 SITENAME:
 OWNER: FLATHEAD NATIONAL FOREST
 OWNERCOMM:
 PROTCOMM:
 MGMTCOMM:
 MONITOR: MONITORNUM:
 BESTSOURCE: ASH, MARIA. P.O. BOX 44, HUNGRY HORSE, MT 59919.
 SOURCECODE: PNDASH01MTUS
 DATASENS: N BOUNDARIES: Y PHOTOS: N OWNERINFO:
 TRANSCRIBR: 88-08-29 JSS CDREV: Y MAPPER: 88-08-29 JSS QC: Y
 UPDATE: 88-11-22 JSS

ELEMENT OCCURRENCE RECORD

EOCODE: PMORC0Q0A0.009
 NAME: CYPRIPEDIUM PASSERINUM
 COMNAME: SPARROW'S-EGG LADY'S-SLIPPER
 MARGNUM: Ø TENTEN: IDENT: Y EORANK:
 SURVEYSITE:
 EORANKCOMM:
 SURVEYDATE: LASTOBS: 1894- - FIRSTOBS: 1894 GRANK: G4G5
 SRANK: S2 STATE: MT COUNTYNAME: MTFLAT
 QUADCODE:
 QUADNAME: UNMAPPABLE PRECISION: U
 LAT: Ø LONG: Ø S: Ø N: Ø E: Ø W: Ø
 TOWNRANGE: SECTION: MERIDIAN: PR TRSCOMM:
 PHYSPROV: NR WATERSHED: RIVERREACH:
 DIRECTIONS: COLUMBIA FALLS (HISTORICAL RECORD).

GENDESC: UNKNOWN.

ELEV: -11111 SIZE: Ø
 EODATA: UNKNOWN; SPECIMEN IN FLOWER.

COMMENTS: "FIDE RYDBERG."

MACODE1: CONTAINED1: MACODE2: CONTAINED2:
 MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
 MOREMGMT: F SITECODE:
 SITENAME:
 OWNER:
 OWNERCOMM:
 PROTCOMM:
 MGMTCOMM:
 MONITOR: MONITORNUM:
 BESTSOURCE: KENNEDY, MRS. J.J. (19), 1894, MONT.

SOURCECODE: S94KENMSMTUS

DATASENS: N BOUNDARIES: N PHOTOS: N OWNERINFO:
 TRANSCRIBR: 88-10-18 JSS CDREV: Y MAPPER: 88-10-18 QC: Y
 UPDATE: 88-11-22 MEZ

ELEMENT OCCURRENCE RECORD

EOCODE: PMORC0Q0A0.010
 NAME: CYPRIPEDIUM PASSERINUM
 COMNAME: SPARROW'S-EGG LADY'S-SLIPPER
 MARGNUM: 5 TENTEN: 4,8 IDENT: Y EORANK: B
 SURVEYSITE: CLARY COULEE
 EORANKCOMM: FAIRLY LARGE POPULATION, HABITAT IN GOOD CONDITION.
 SURVEYDATE: 1988-08-10 LASTOBS: 1988-08-10 FIRSTOBS: 1988 GRANK: G4G5
 SRANK: S2 STATE: MT COUNTYNAME: MTTETO
 QUADCODE: 4711286
 QUADNAME: CAVE MOUNTAIN PRECISION: SC
 LAT: 475343 LONG: 1124210 S: 475338 N: 475345 E: 1124207 W: 1124212
 TOWNRANGE: 025N009W SECTION: 25 MERIDIAN: PR TRSCOMM: NE4

 PHYSPROV: NR WATERSHED: 10030205 RIVERREACH:
 DIRECTIONS: ROCKY MOUNTAIN FRONT RANGE, CLARY COULEE, ALONG TRAIL (#177)
 CA. 0.8 MILE NORTH OF NORTH FORK TETON RIVER.

 GENDESC: MARGINS OF SEEPS, IN SATURATED SOILS; WITH PICEA
 ENGELMANNII, CAREX GYNOCRATES, C. AUREA, LINNAEA BOREALIS,
 PARNASSIA FIMBRIATA, ORCHIS ROTUNDIFOLIA.
 ELEV: 5600 SIZE: 2
 EODATA: 93 STEMS, 33 WITH CAPSULES; TWO SUBPOPULATIONS; SITE IS
 DIRECTLY ADJACENT TO HIKING TRAIL, AND A PORTION OF THE
 NORTHERNMOST SEEP HAS BEEN ALTERED BY IT.

 COMMENTS: SIGHT RECORD.

 MACODE1: FFSNFLEWI9MTUS CONTAINED1: Y MACODE2: CONTAINED2:

 MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
 MOREMGMT: F SITECODE:
 SITENAME:
 OWNER: LEWIS & CLARK NATIONAL FOREST
 OWNERCOMM:
 PROTCOMM:
 MGMTCOMM:
 MONITOR: MONITORNUM:
 BESTSOURCE: FIELD, DANA.

 SOURCECODE: PNDFIE01MTUS

 DATASENS: N BOUNDARIES: Y PHOTOS: N OWNERINFO:
 TRANSCRIBR: 88-11-02 JSS CDREV: Y MAPPER: 88-11-02 JSS QC: Y
 UPDATE: 88-11-22 JSS

ELEMENT OCCURRENCE RECORD

EOCODE: PMORC0Q0A0.011
 NAME: CYPRIPEDIUM PASSERINUM
 COMNAME: SPARROW'S-EGG LADY'S-SLIPPER
 MARGNUM: 2 TENTEN: 8,8 IDENT: Y EORANK: B
 SURVEYSITE: NORTH FORK BIRCH CREEK
 EORANKCOMM: LARGE POPULATION, HABITAT IN GOOD CONDITION.
 SURVEYDATE: 1988-08-15 LASTOBS: 1988-08-15 FIRSTOBS: 1988 GRANK: 6465
 SRANK: S2 STATE: MT COUNTYNAME: MTPOND
 QUADCODE: 4811228
 QUADNAME: SWIFT RESERVOIR PRECISION: SC
 LAT: 480928 LONG: 1125404 S: 480926 N: 480931 E: 1125357 W: 1125407
 TOWNRANGE: 02BN010W SECTION: 28 MERIDIAN: PR TRSCOMM: N2

 PHYSPROV: NR WATERSHED: 10030201 RIVERREACH:
 DIRECTIONS: ROCKY MOUNTAIN FRONT RANGE, NORTH FORK BIRCH CREEK, 0.1 AIR
 MILE SSW. OF CONFLUENCE WITH HAYWOOD CREEK, NEAR WEST END OF
 SWIFT RESERVOIR.
 GENDESC: SEEPAGE AREAS IN GULLIES, ON MORE STABLE EDGES; PICEA
 ENGELMANNII/GALIUM TRIFLORUM HABITAT TYPE, WITH ORCHIS
 ROTUNDIFOLIA, ANTEENNARIA PULCHERRIMA.
 ELEV: 5040 SIZE: 2
 EODATA: 388 STEMS, 106 WITH CAPSULES; THREE SUBPOPULATIONS; NO
 GRAZING OCCURRING, BUT SITE IS NEAR TRAIL, WHICH COULD
 DESTABILIZE SLOPE.

 COMMENTS: SIGHT RECORD.

 MACODE1: FFSNFLEWI9MTUS CONTAINED1: Y MACODE2: CONTAINED2:

 MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
 MOREMGMT: F SITECODE:
 SITENAME:
 OWNER: LEWIS & CLARK NATIONAL FOREST
 OWNERCOMM:
 PROTCOMM:
 MGMTCOMM:
 MONITOR: MONITORNUM:
 BESTSOURCE: FIELD, DANA.

 SOURCECODE: PNDFIE01MTUS

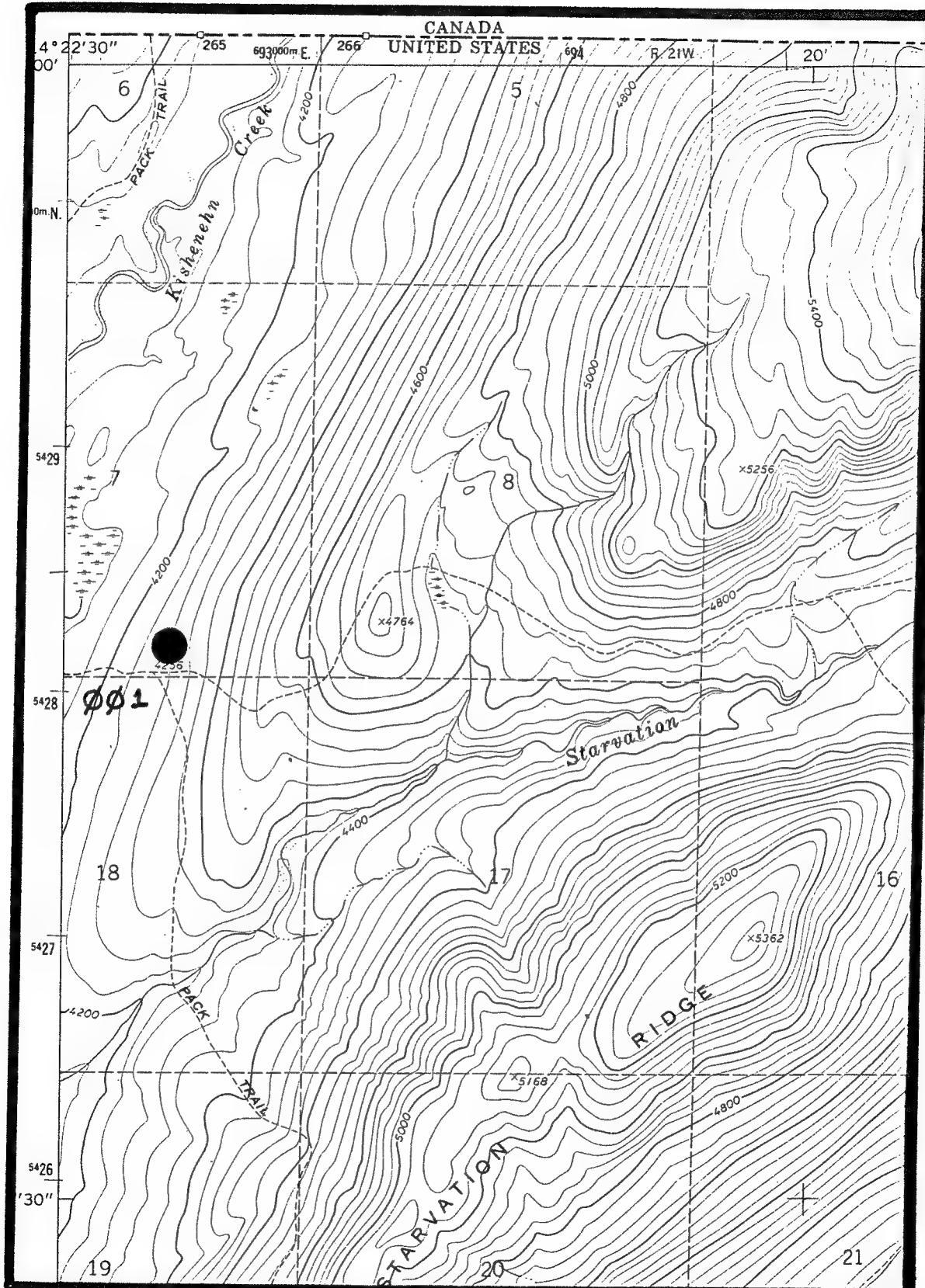
 DATASENS: N BOUNDARIES: Y PHOTOS: N OWNERINFO:
 TRANSCRIBR: 88-11-03 JSS CDREV: Y MAPPER: 88-11-03 JSS QC: Y
 UPDATE: 88-11-22 JSS

ELEMENT OCCURRENCE RECORD

EOocode: PMORC000A0.012
 NAME: CYPRIPEDIUM PASSERINUM
 COMNAME: SPARROW'S-EGG LADY'S-SLIPPER
 MARGNUM: 1 TENTEN: 10,2 IDENT: Y EORANK:
 SURVEYSITE: STRAIGHT CREEK
 EORANKCOMM:
 SURVEYDATE: 1988-07-03 LASTOBS: 1988-07-03 FIRSTOBS: 1988 GRANK: G4G5
 SRANK: S2 STATE: MT COUNTYNAME: MTLEWI
 QUADCODE: 4711248 4711247
 QUADNAME: BENCHMARK, WOOD LAKE PRECISION: M
 LAT: 472851 LONG: 1125256 S: 0 N: 0 E: 0 W: 0
 TOWNRANGE: 020N010W SECTION: 16 MERIDIAN: PR TRSCOMM: 34
 PHYSPROV: NR WATERSHED: 10030104 RIVERREACH:
 DIRECTIONS: ROCKY MOUNTAIN FRONT RANGE, STRAIGHT CREEK, CA. 1/2 MILE OR
 LESS SOUTH OF BENCHMARK TRAILHEAD, AND CA. 3 MILES SOUTH OF
 TRAILHEAD, ON TRAIL #212.
 GENDESC: SATURATED DITCH AND SEEPS NEAR TRAIL, IN FULL TO FILTERED
 SHADE; WITH EQUISETUM SP., AND PROBABLY SPRUCE.
 ELEV: 5400 SIZE: 0
 EODATA: CA. 25 PLANTS (NORTH SITE), IN LATE FLOWER AND IMMATURE
 FRUIT; SIZE OF SOUTHERN POPULATION UNKNOWN.

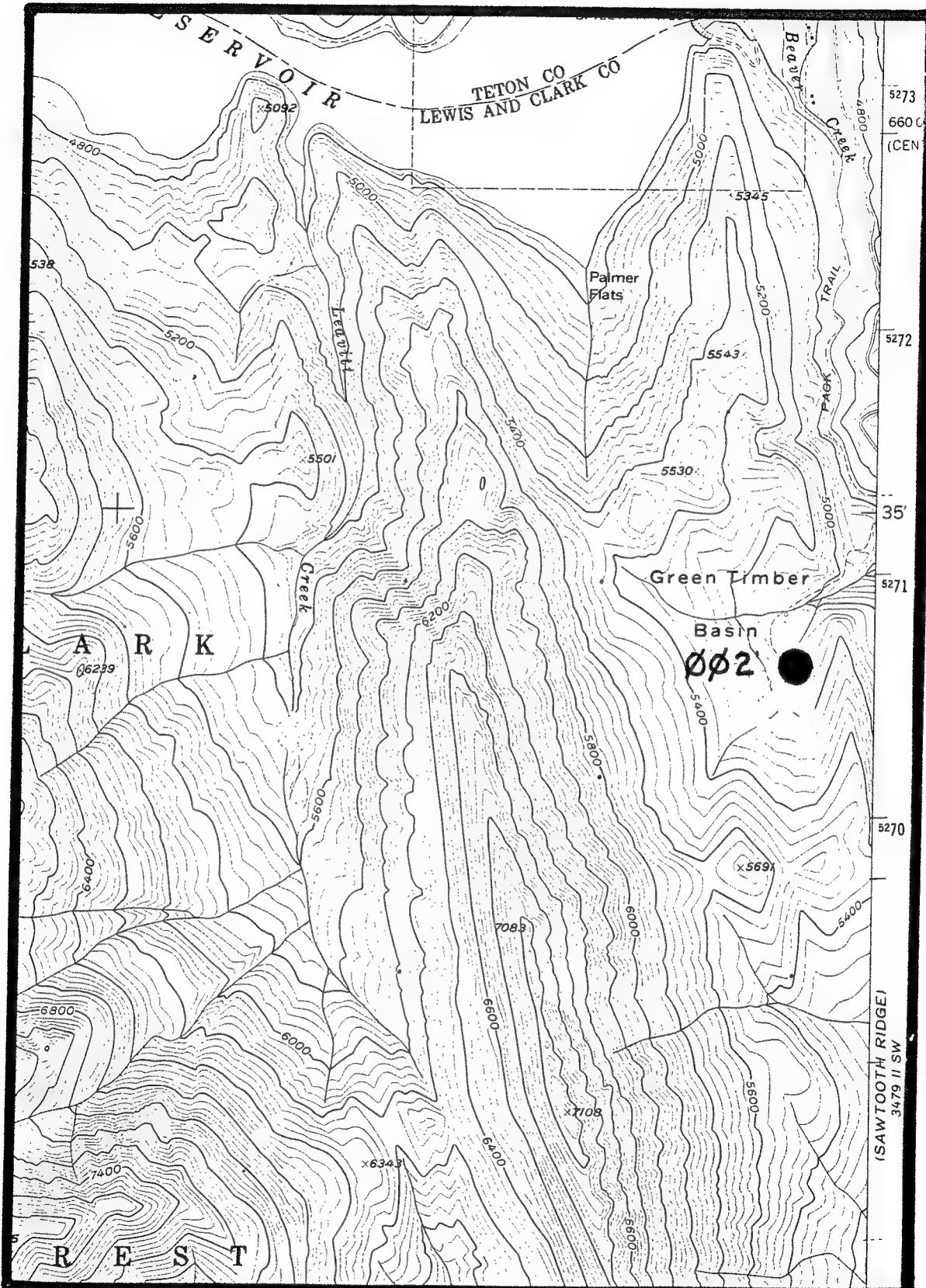
 COMMENTS: SIGHT RECORD, SITE LOCATED BY CARLEY McCAULAY; PHOTOGRAPH
 IDENTIFIED BY WAYNE PHILLIPS.
 MACODE1: FFSWASCAP1MTUS CONTAINED1: N MACODE2: FFSNFLEWI9MTUS CONTAINED2:
 Y
 MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
 MOREMGMT: F SITECODE:
 SITENAME:
 OWNER: LEWIS & CLARK NATIONAL FOREST
 OWNERCOMM:
 PROTCOMM:
 MGMTCOMM:
 MONITOR: MONITORNUM:
 BESTSOURCE: PHILLIPS, WAYNE.
 SOURCECODE: PNDPHI01MTUS

 DATASENS: N BOUNDARIES: N PHOTOS: N OWNERINFO:
 TRANSCRIBR: 88-12-06 JSS CDREV: Y MAPPER: 88-12-06 JSS QC: N
 UPDATE: 88-12-07 JSS

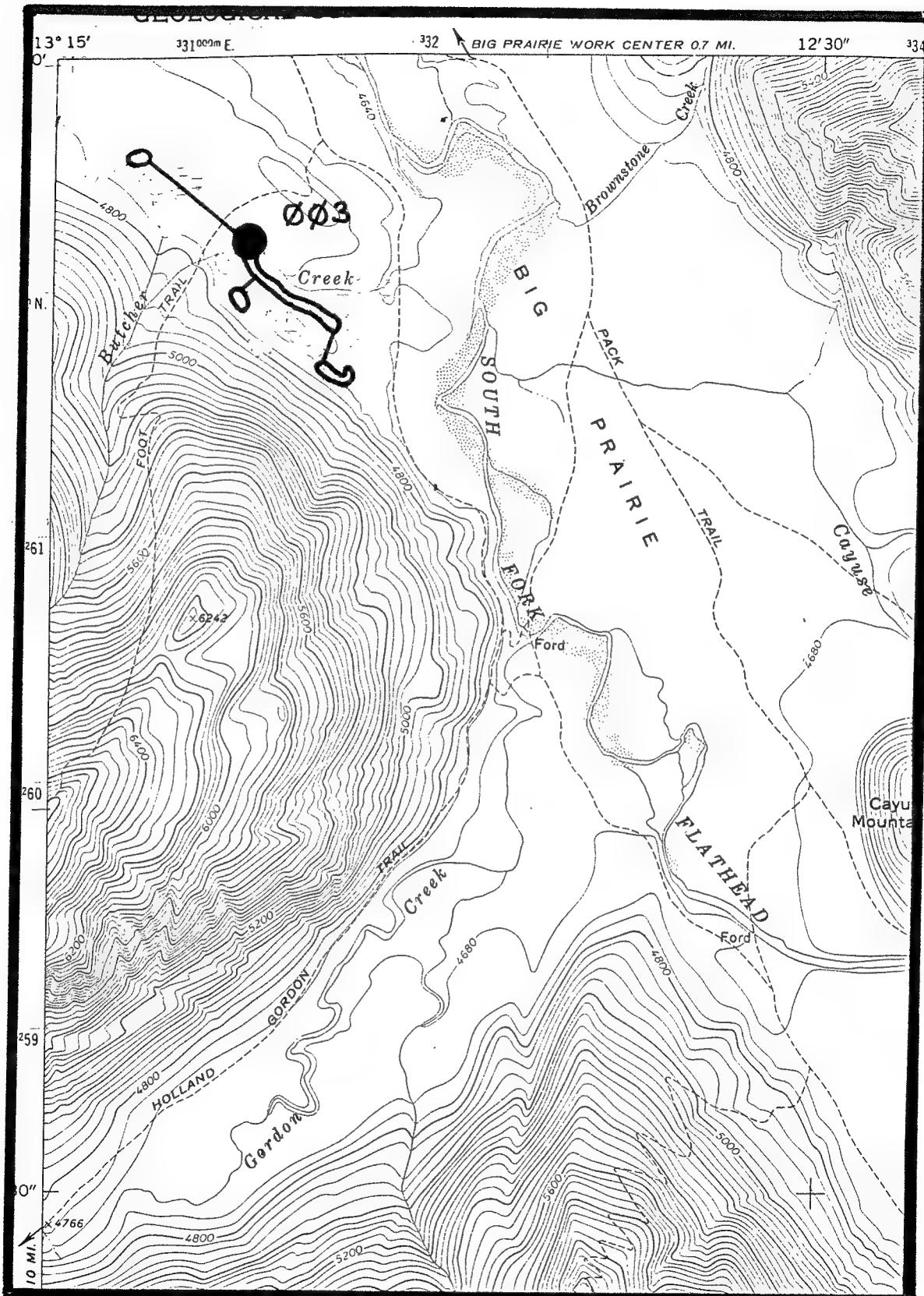


USGS Kintla Lake Quadrangle (7.5')

Cypripedium passerinum

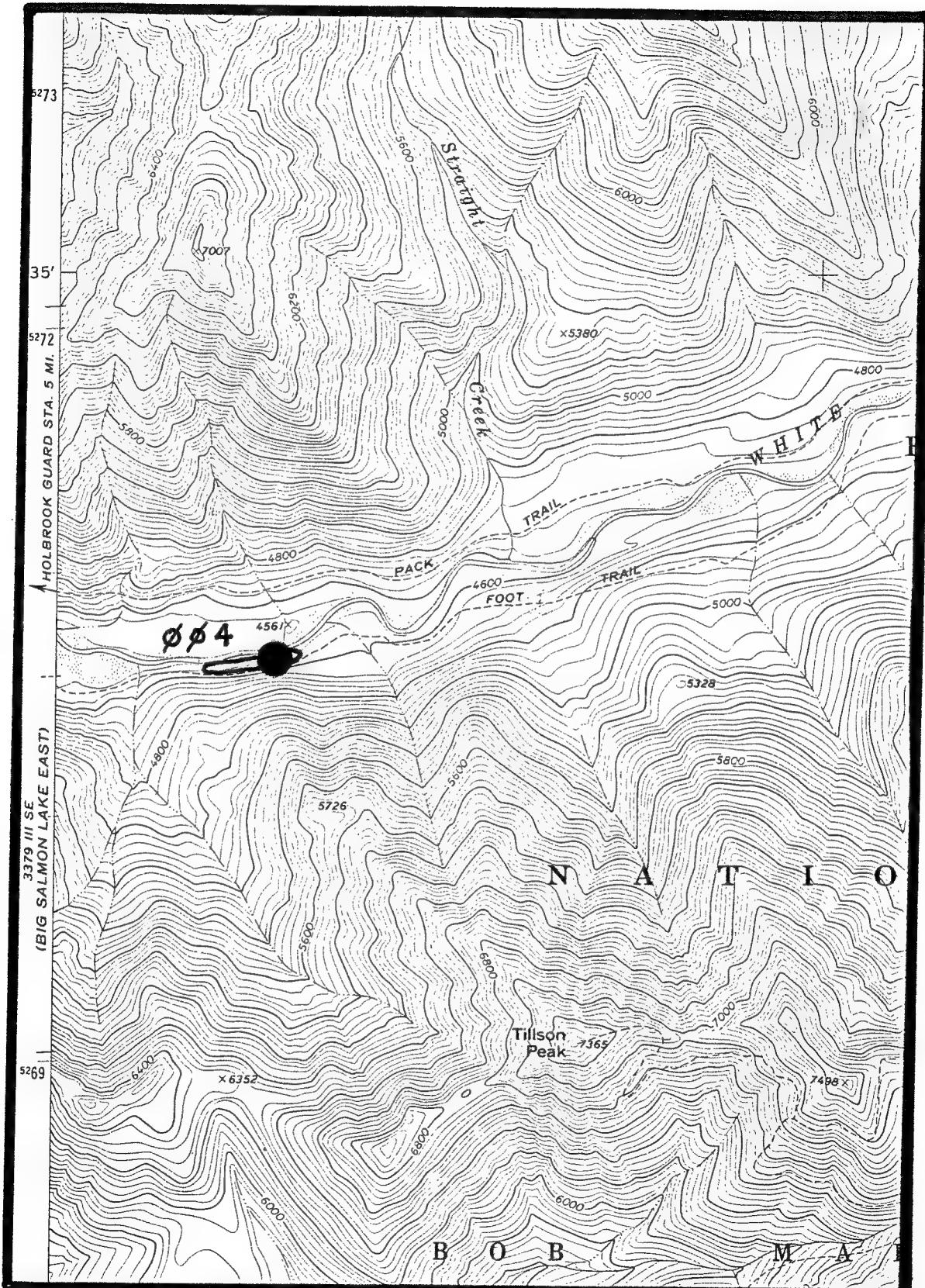


USGS Patricks Basin Quadrangle (7.5')
Cypripedium passerinum



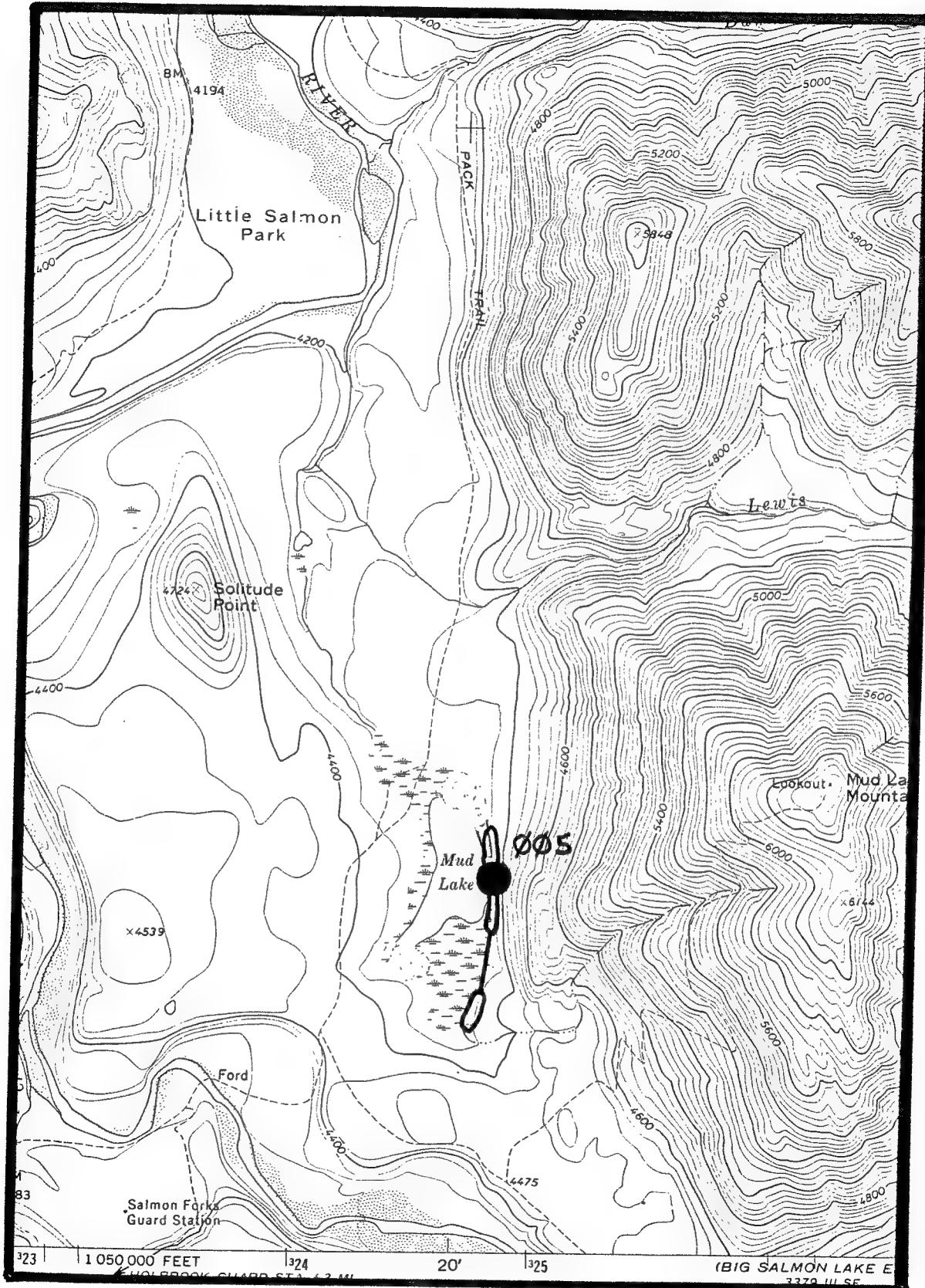
USGS Pilot Peak Quadrangle (7.5')

Cypripedium passerinum



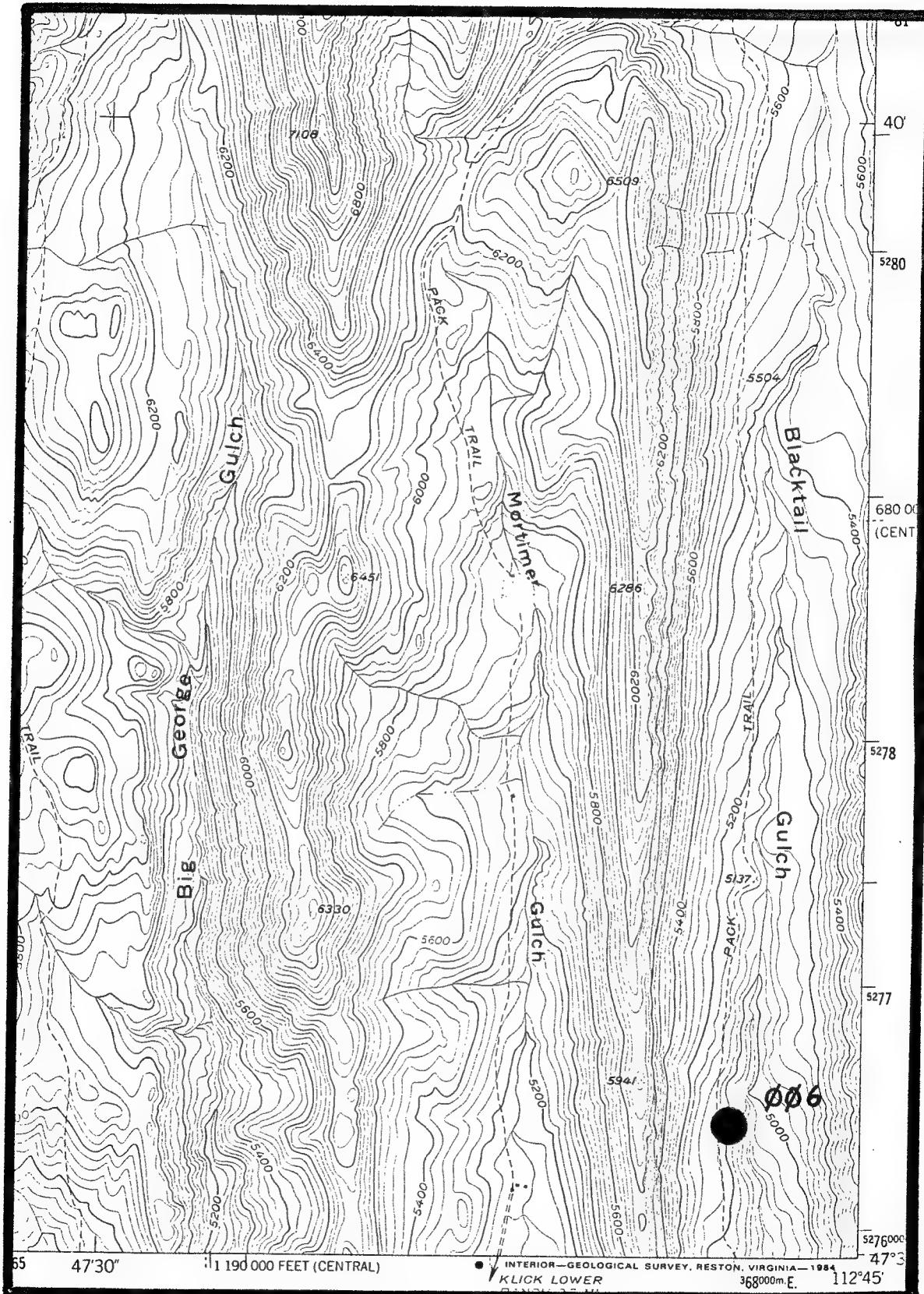
USGS Haystack Mountain Quadrangle (7.5')

Cypripedium passerinum



USGS Pagoda Mountain Quadrangle (7.5')

Cypripedium passerinum



USGS Arsenic Mountain Quadrangle (7.5')

Cypripedium passerinum

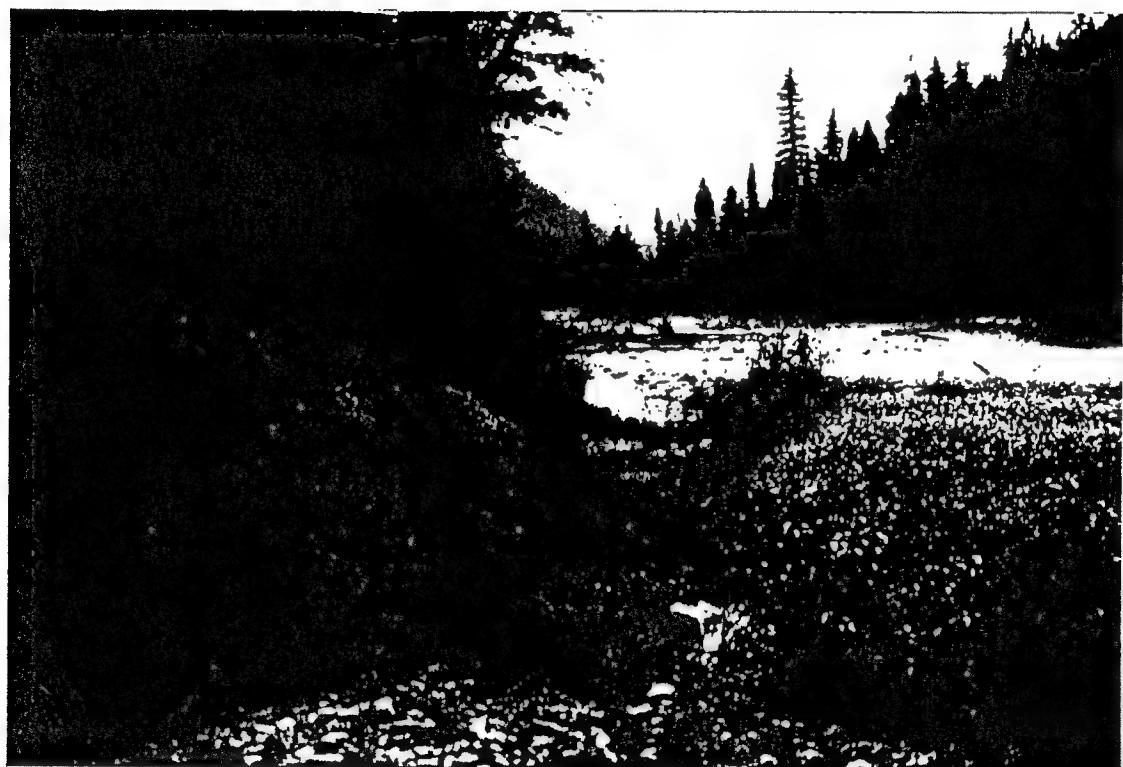
V. PHOTOGRAPHS



A. Cypripedium passerinum - cluster of flowering stems (White River (004) site).



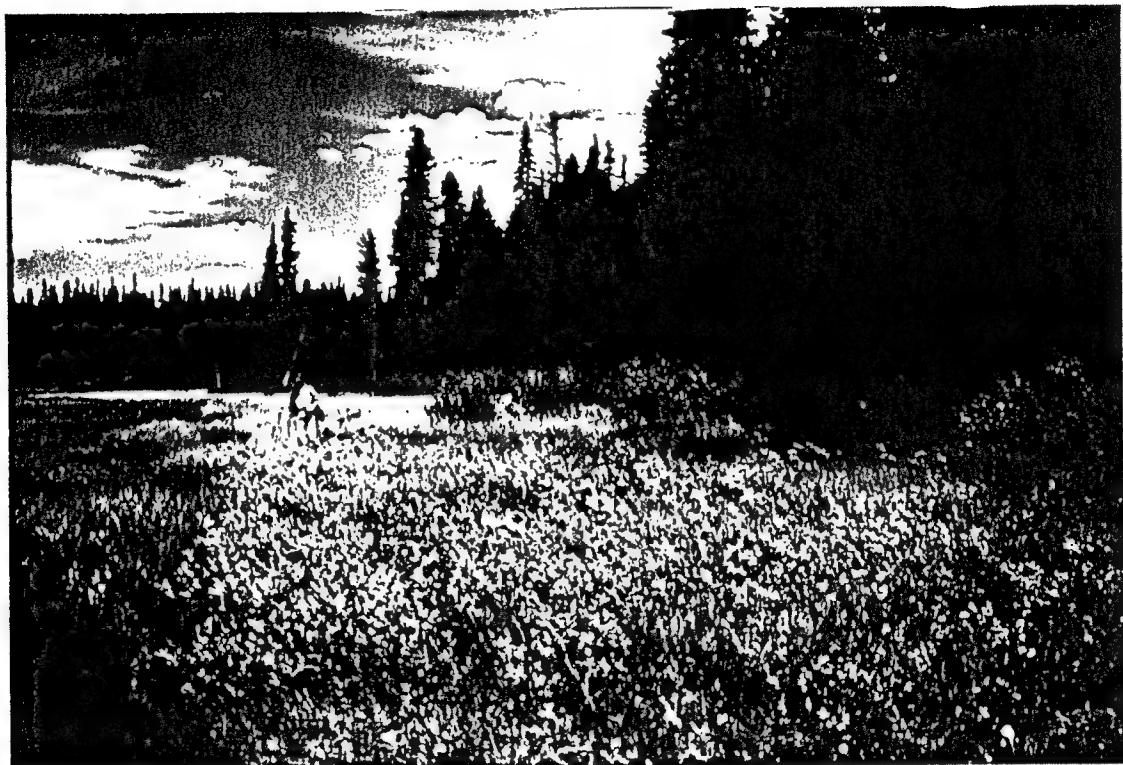
B. Cypripedium passerinum - flowering stem (Mud Lake (005) site).



C. Cypripedium passerinum - habitat along the White River (004); species occurs in low moist area in left foreground, and along forest margin.



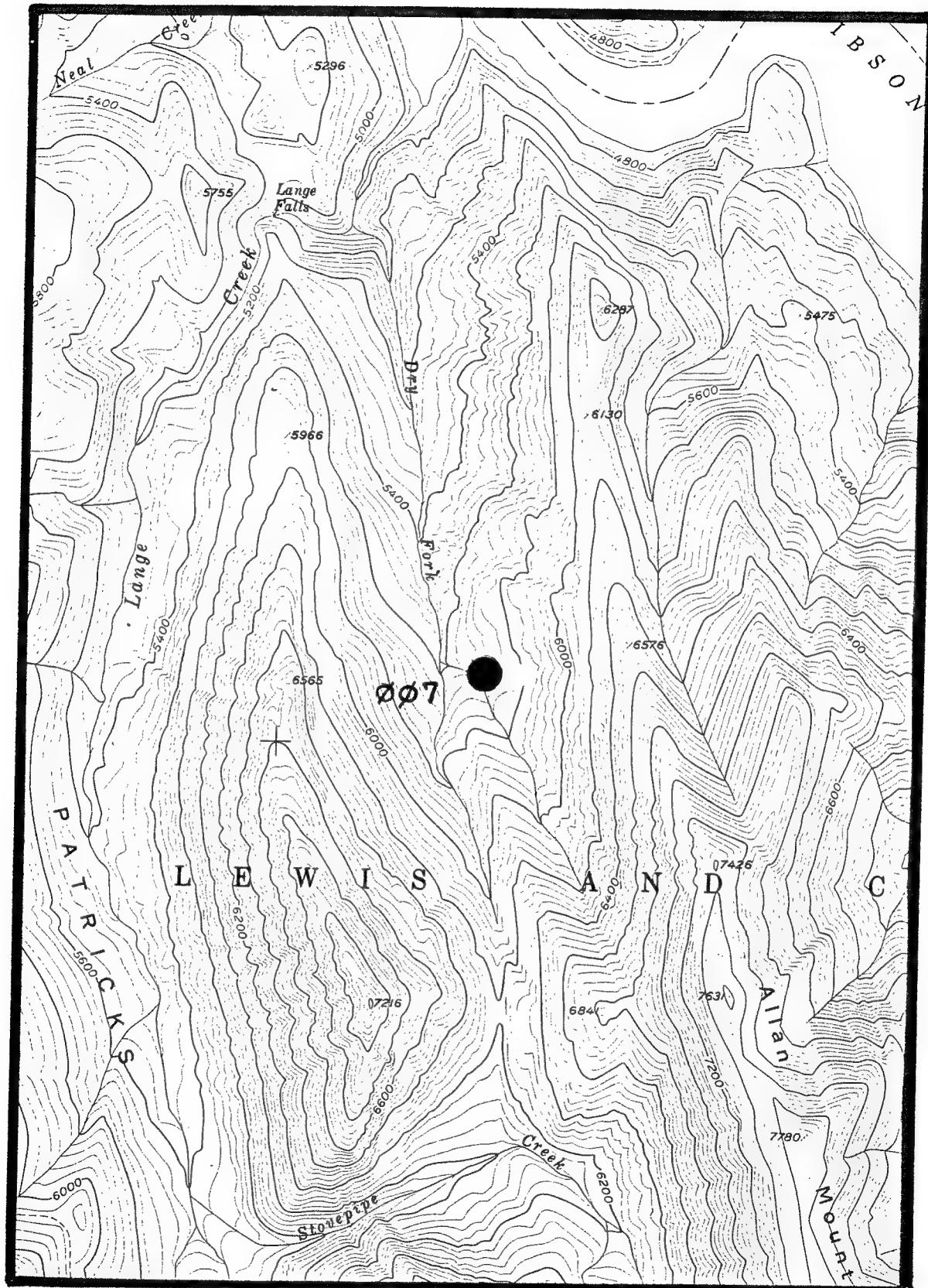
D. Cypripedium passerinum - ecotonal habitat along the White River (004).



E. Cypripedium passerinum - bog meadow on east edge of Mud Lake (005); population occurs in ecotone with forests on the right. Angela Evenden walking in the meadow.

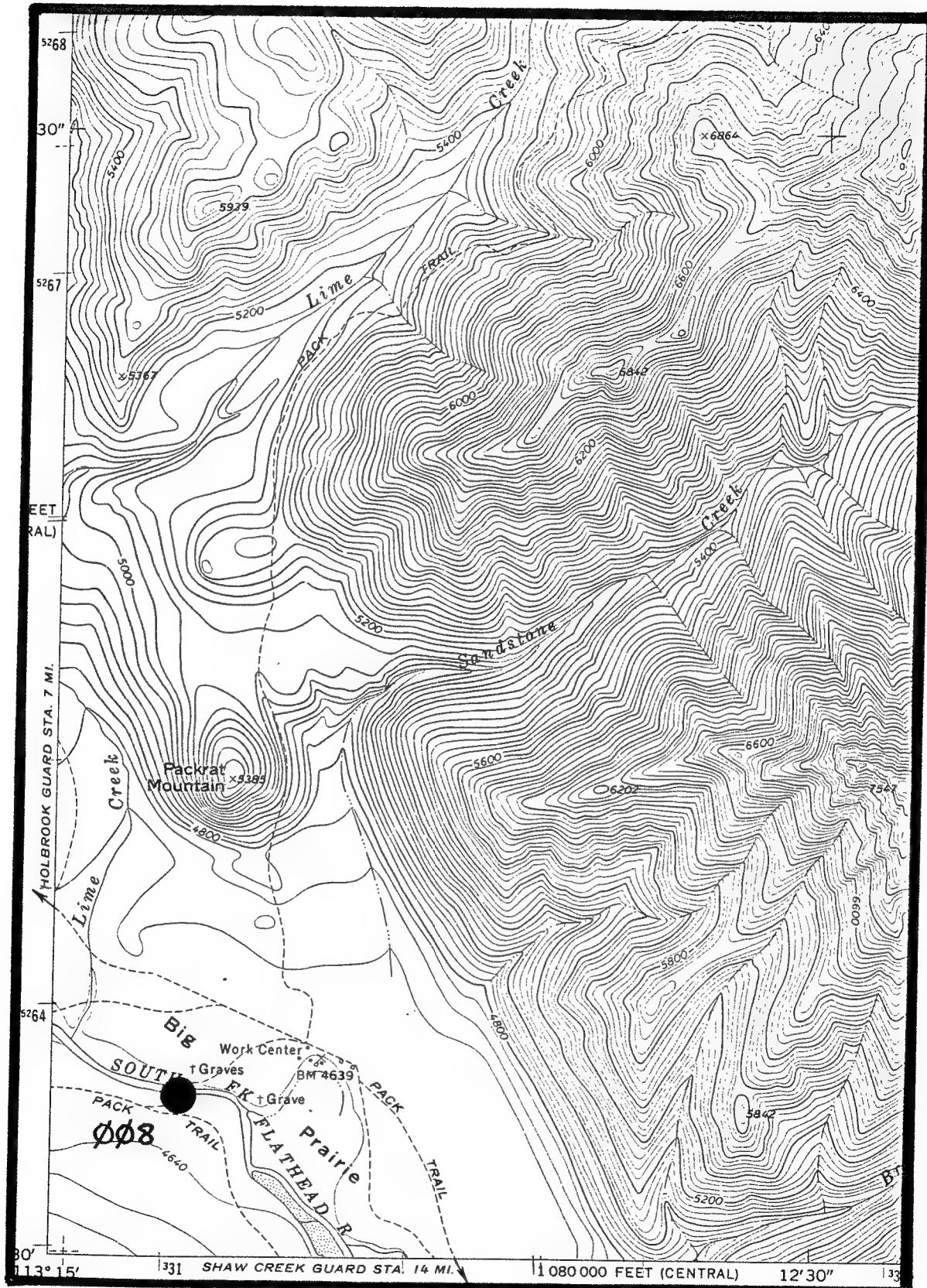


F. Cypripedium passerinum - ecotonal habitat near east side of
Mud Lake (005).



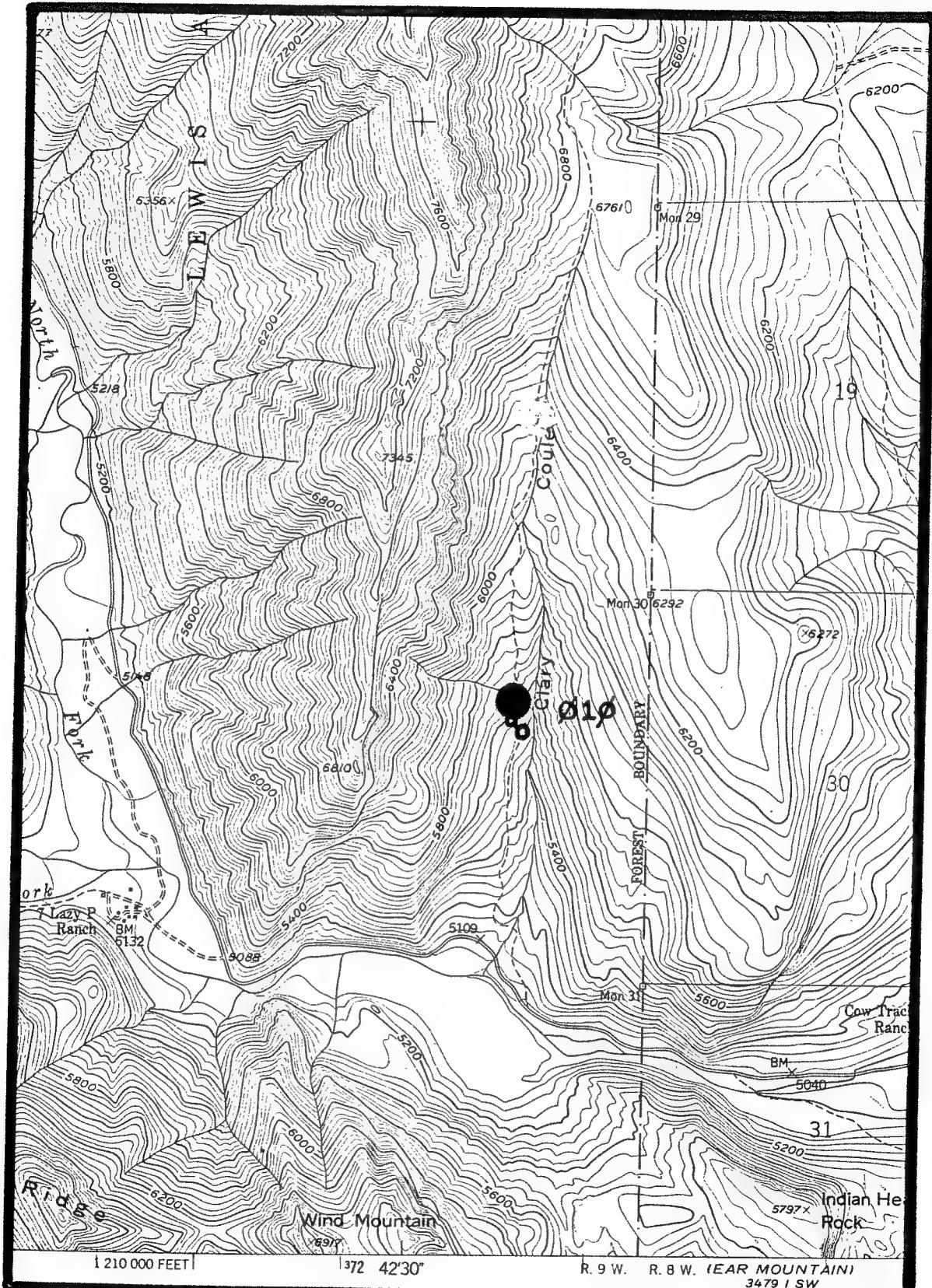
USGS Patricks Basin Quadrangle (7.5')

Cypripedium passerinum



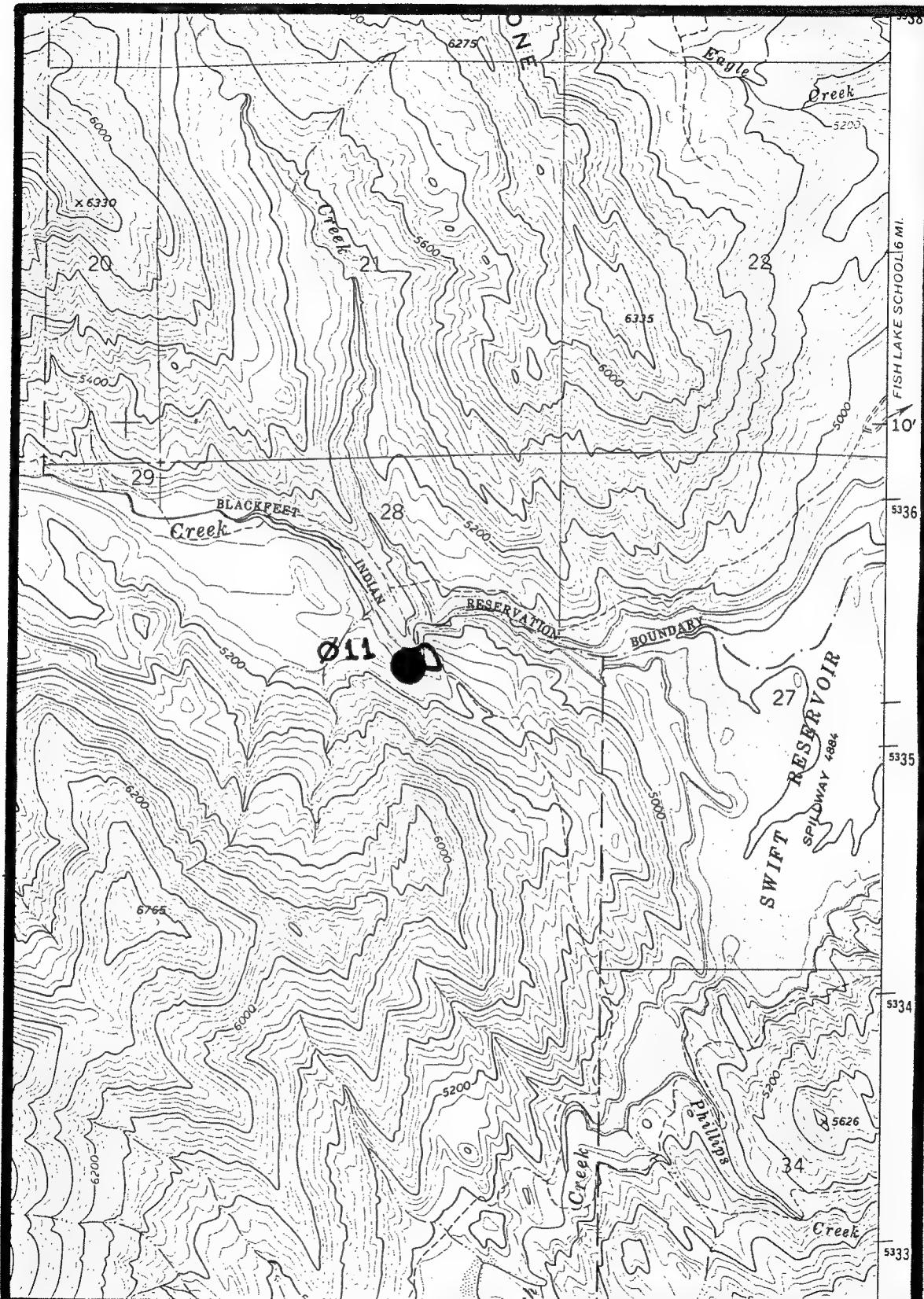
USGS Haystack Mountain Quadrangle (7.5')

Cypripedium passerinum



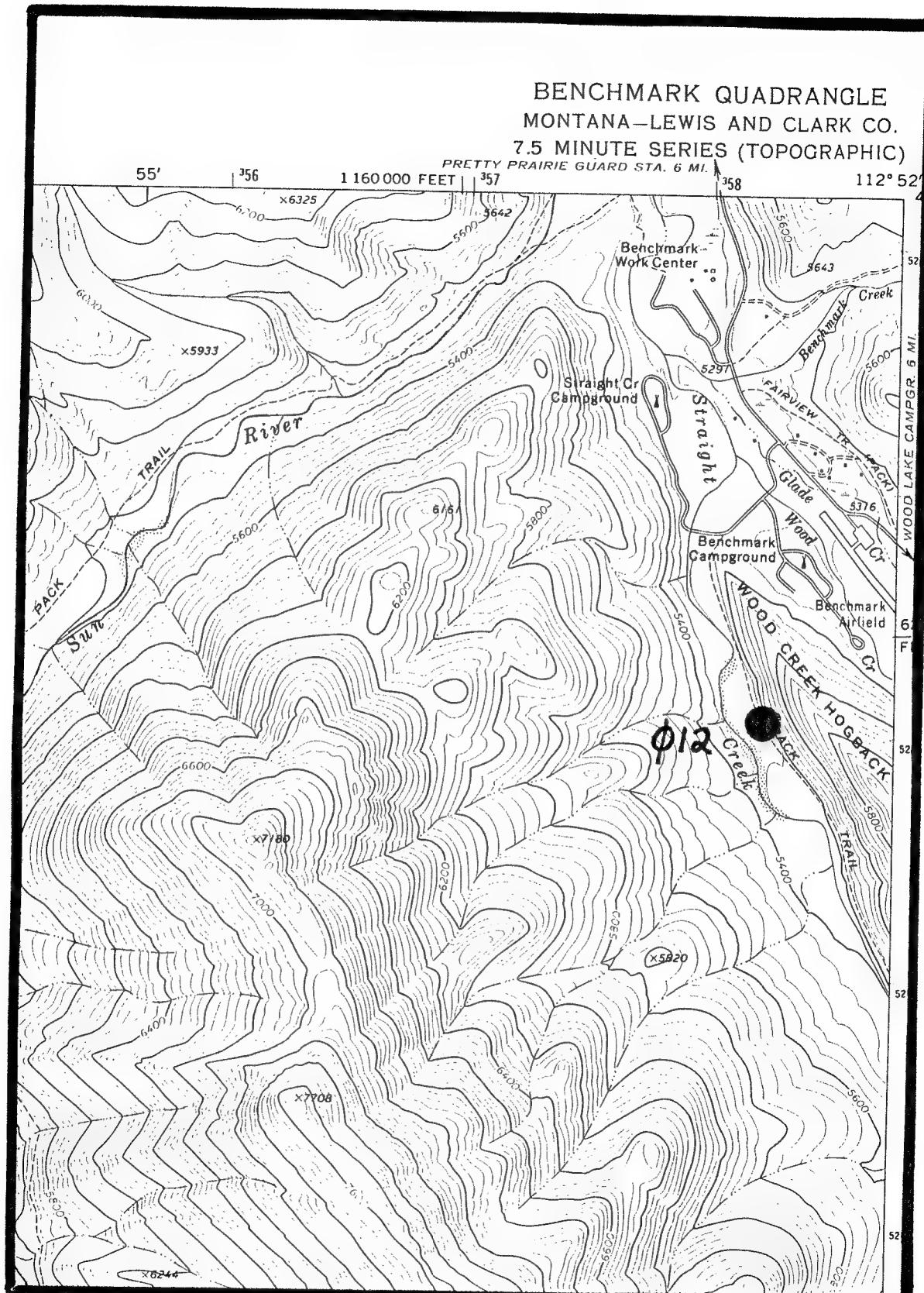
USGS Cave Mountain Quadrangle (7.5')

Cypripedium passerinum



USGS Swift Reservoir Quadrangle (7.5')

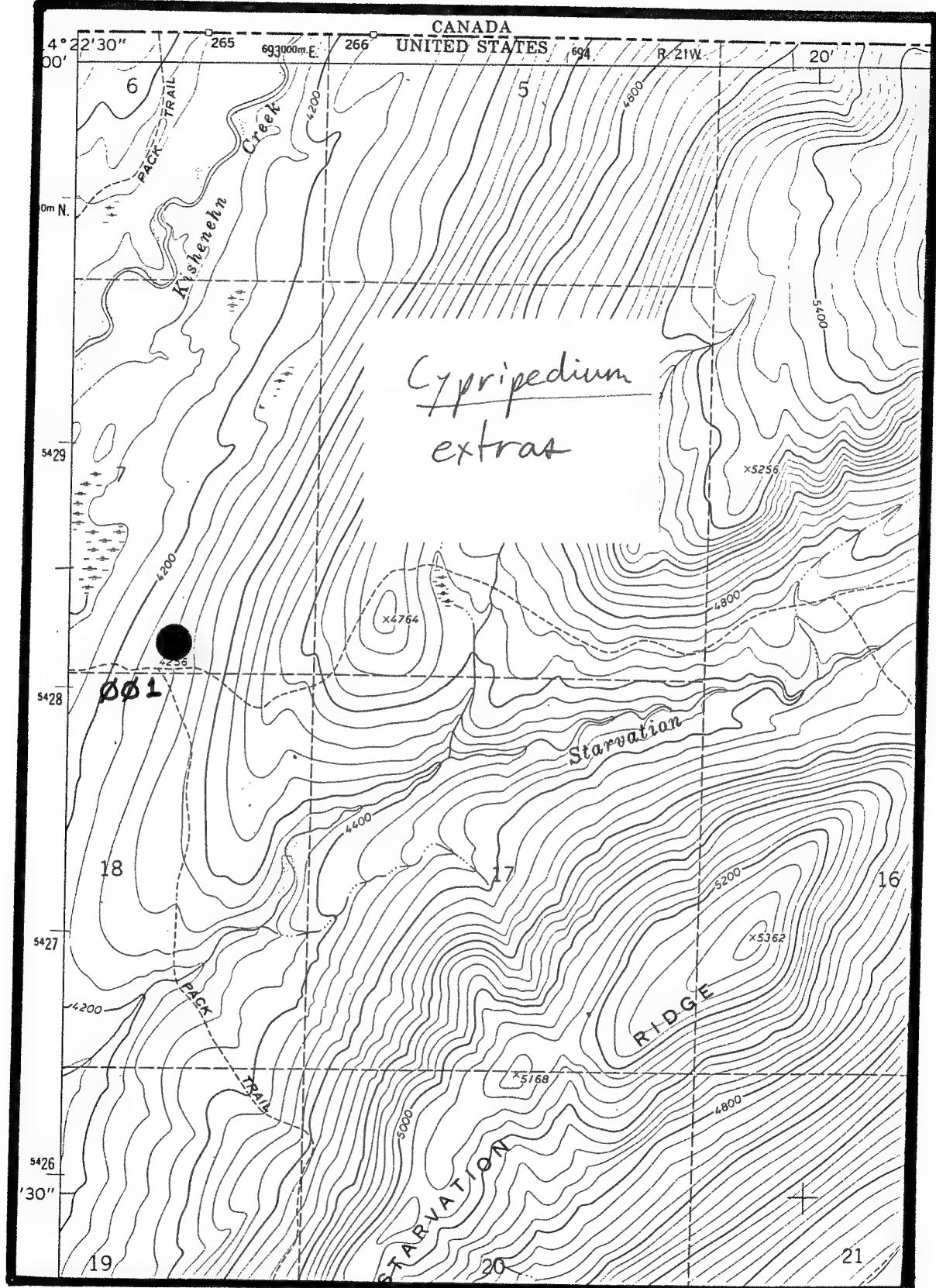
Cypripedium passerinum

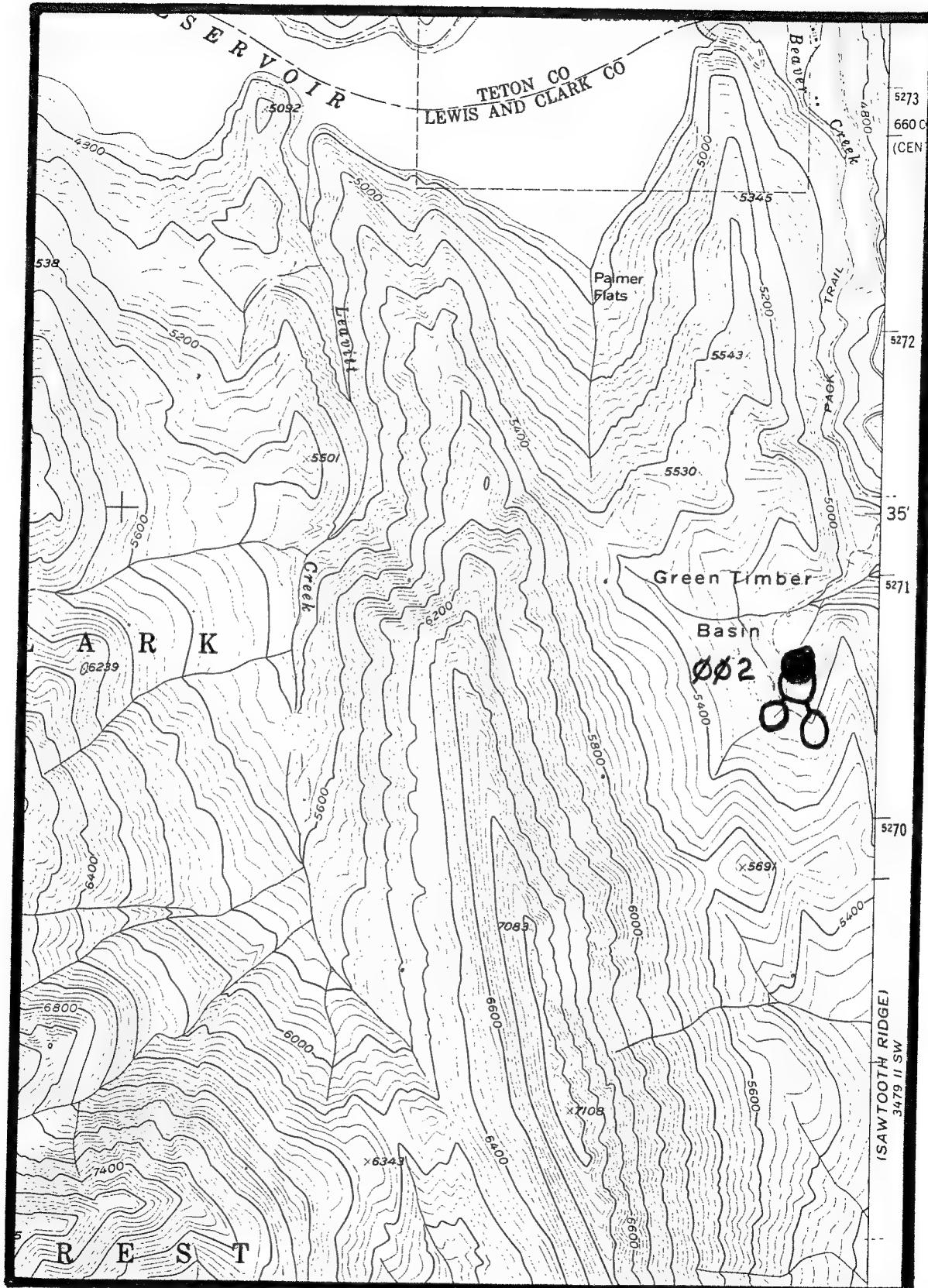


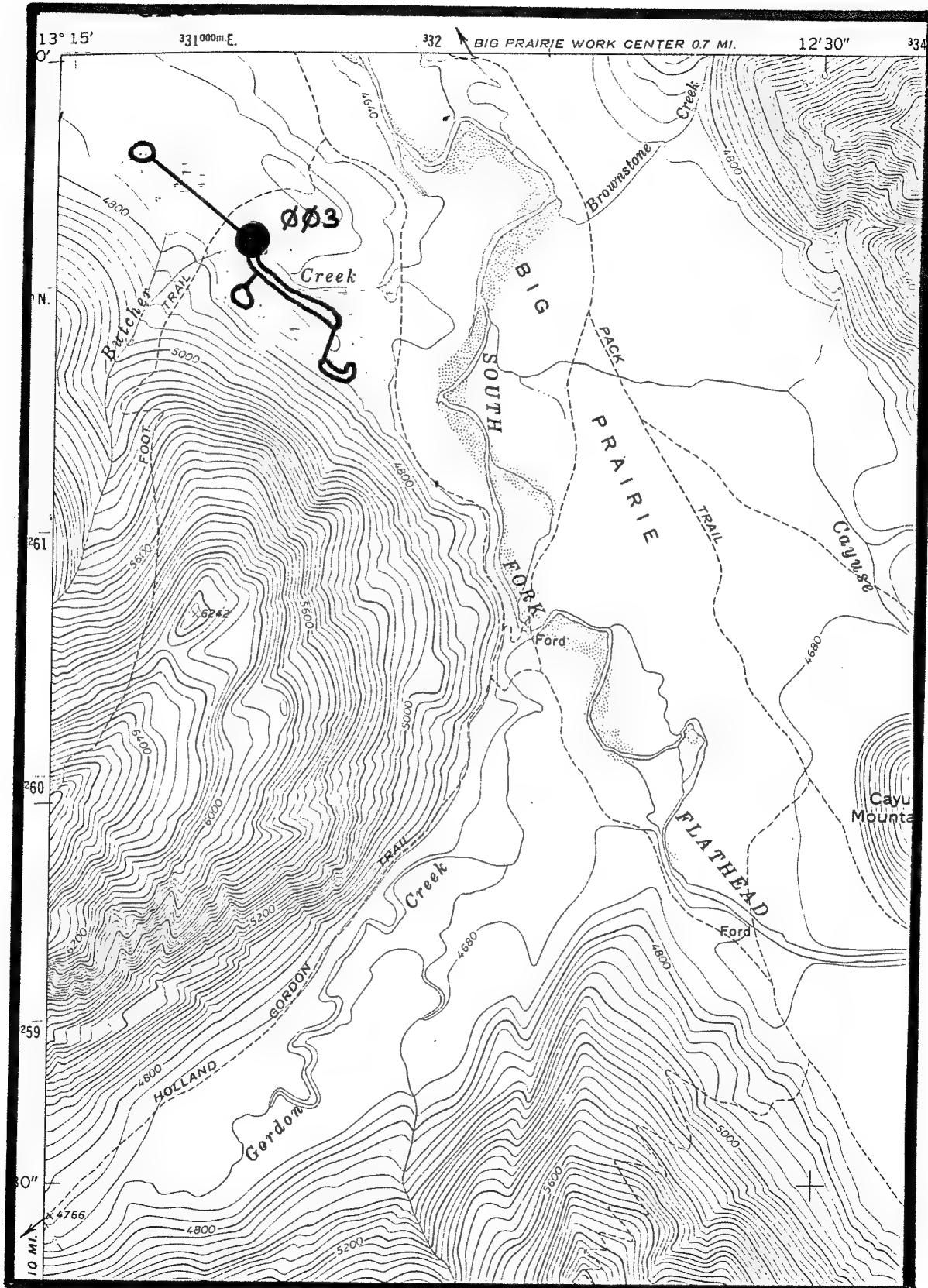
USGS Benchmark Quadrangle (7.5')

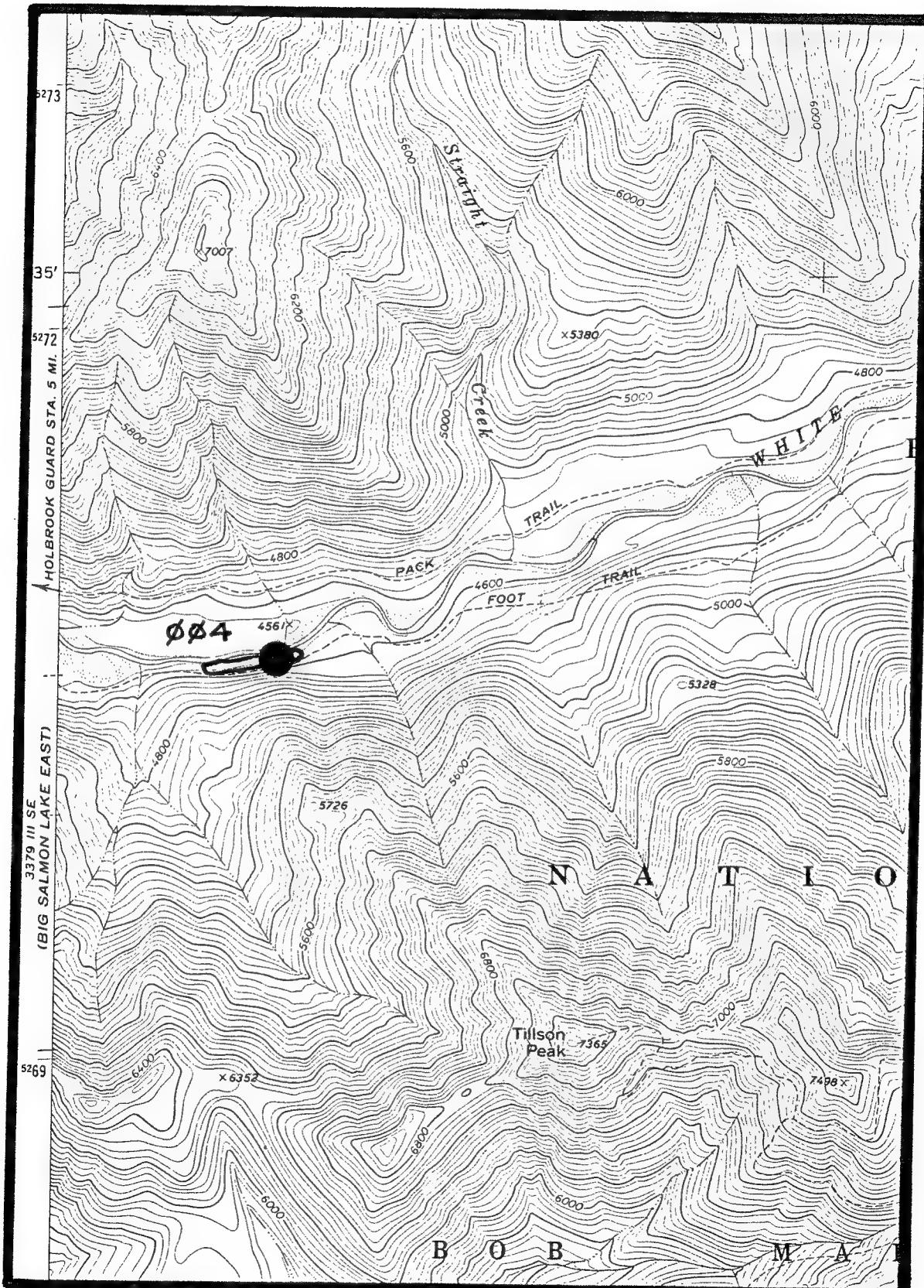
Cypripedium passerinum (approximate
location of unverified report)

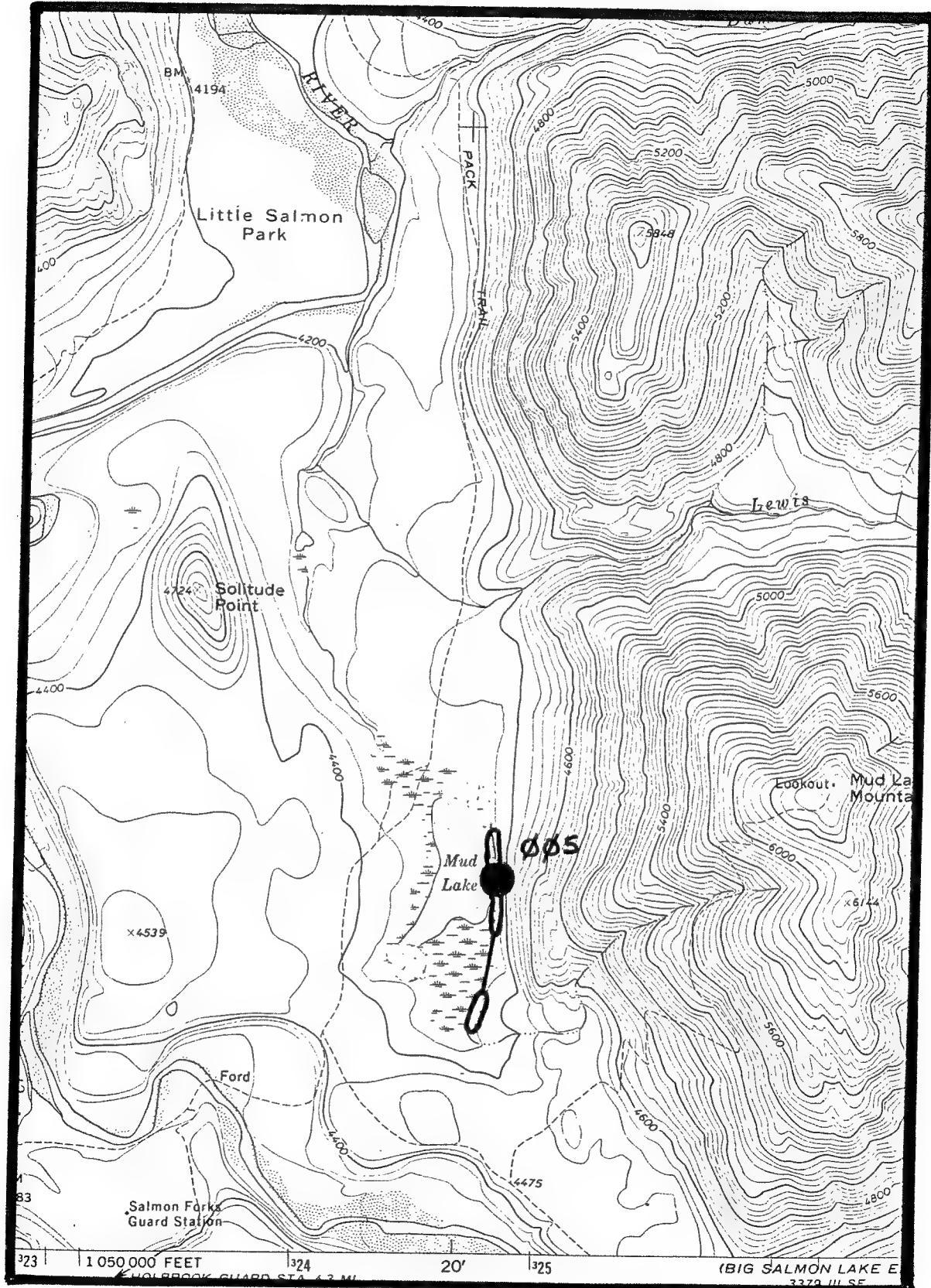
NOTE: The species has also been
reported along Straight Creek
in the Scapegoat Wilderness
Area (Wood Lake Quadrangle).

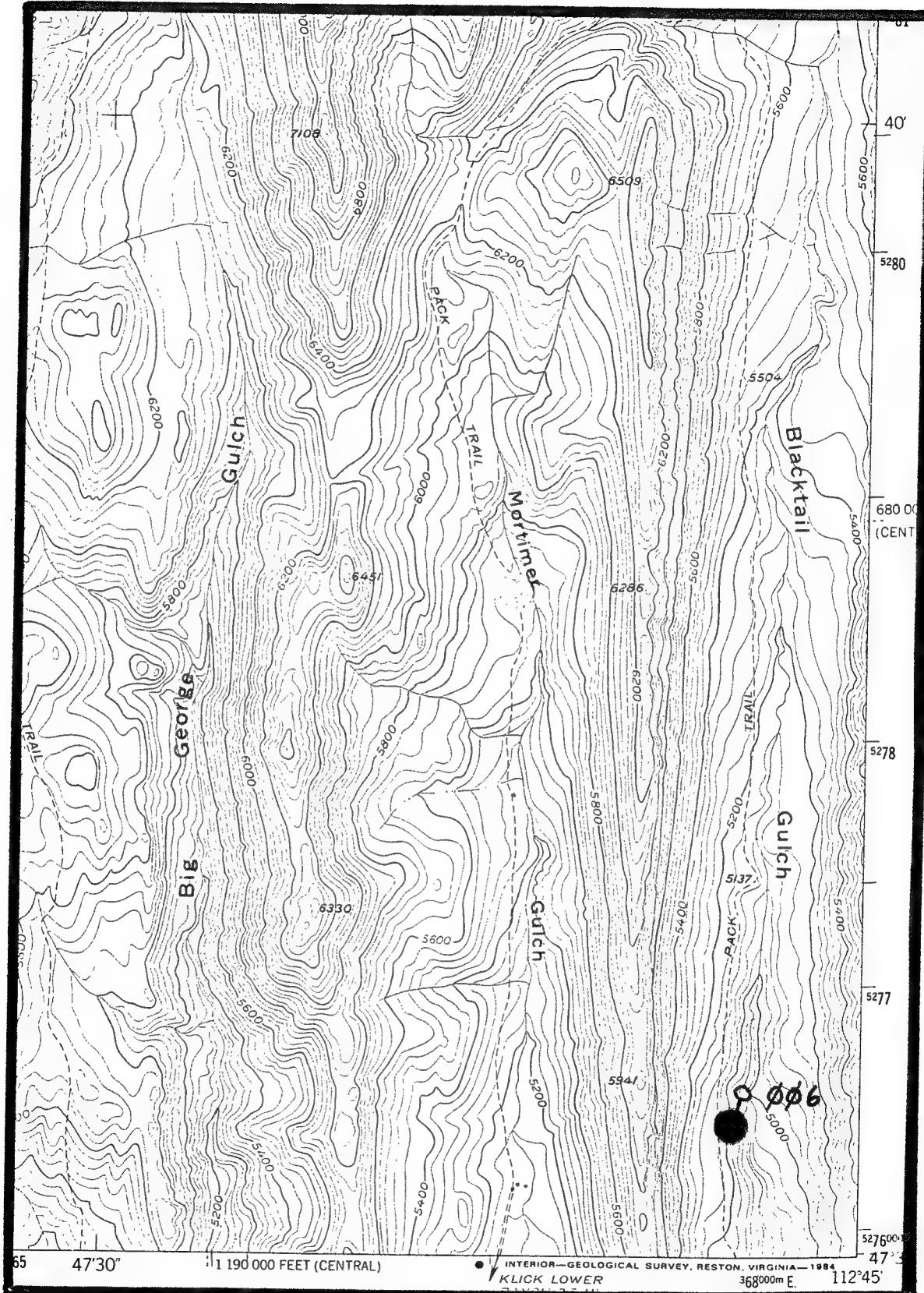


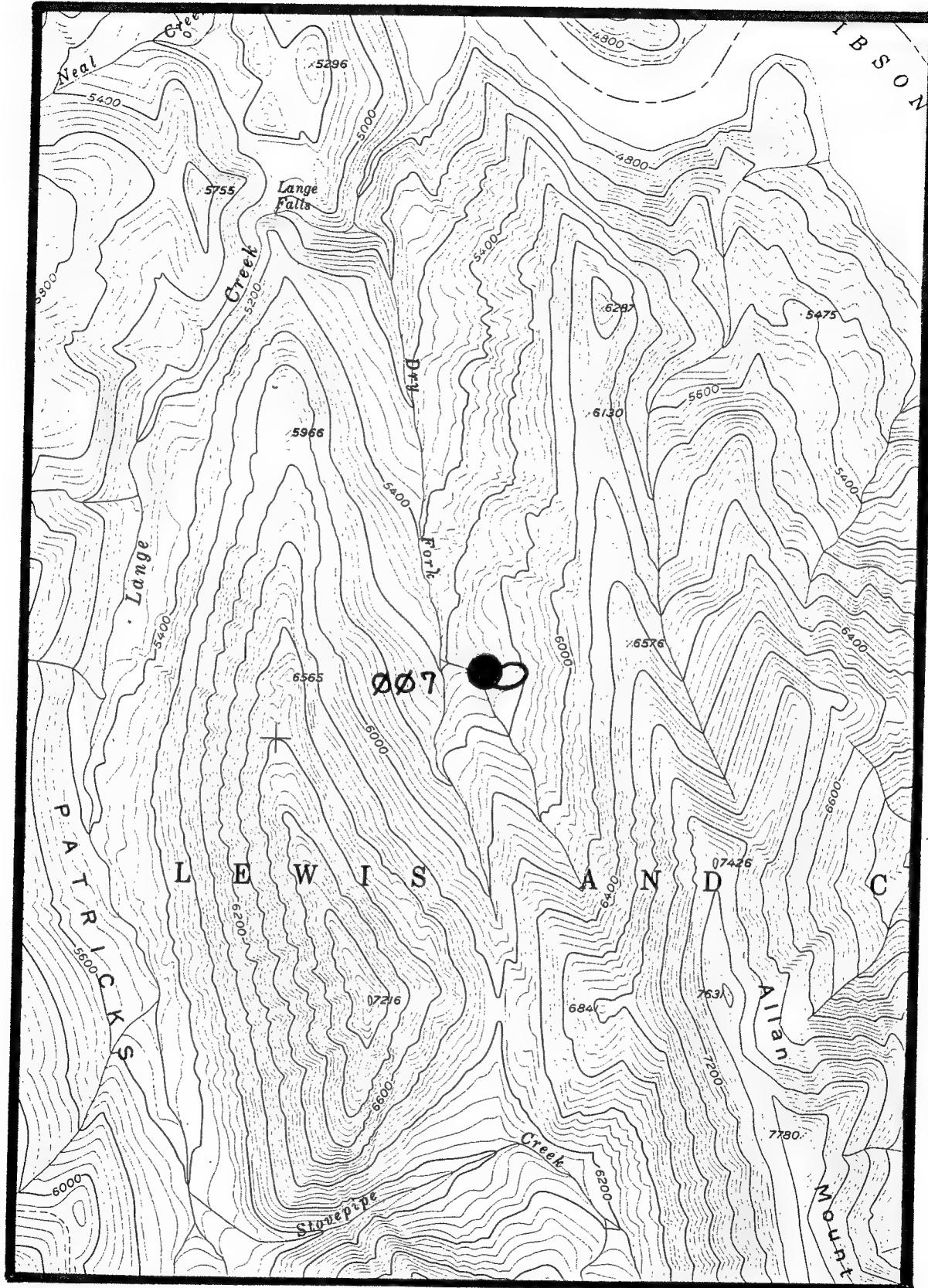


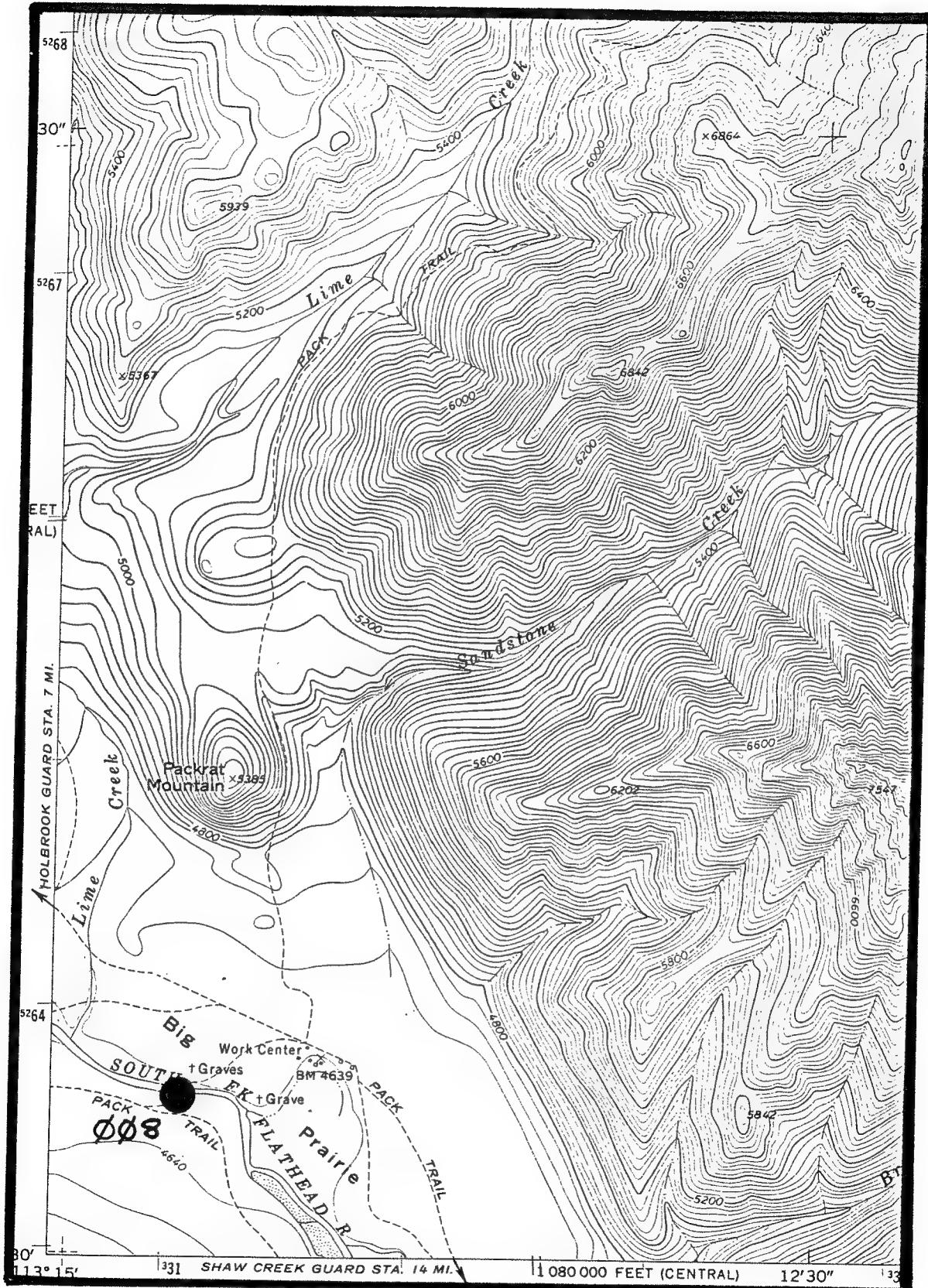


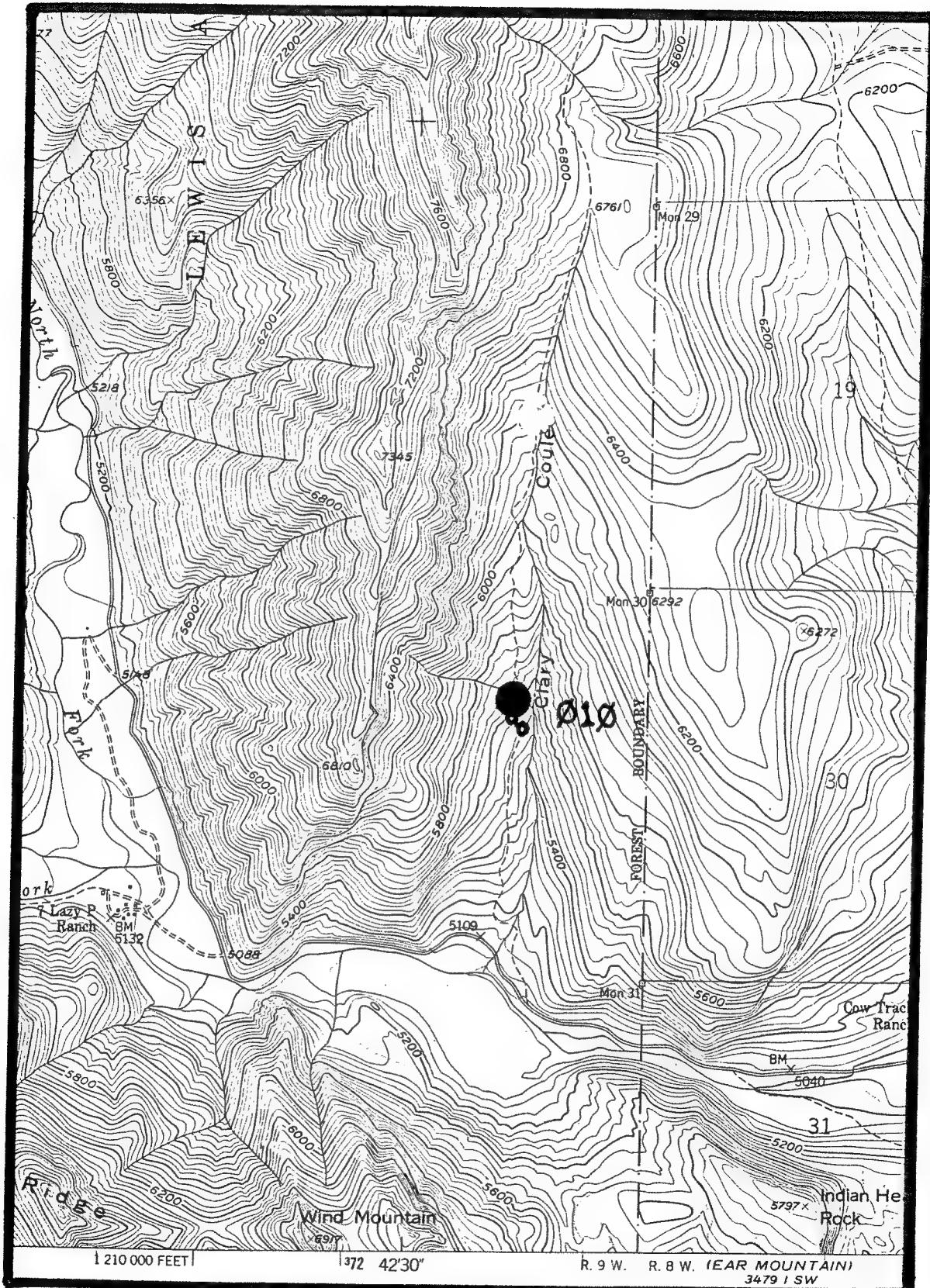


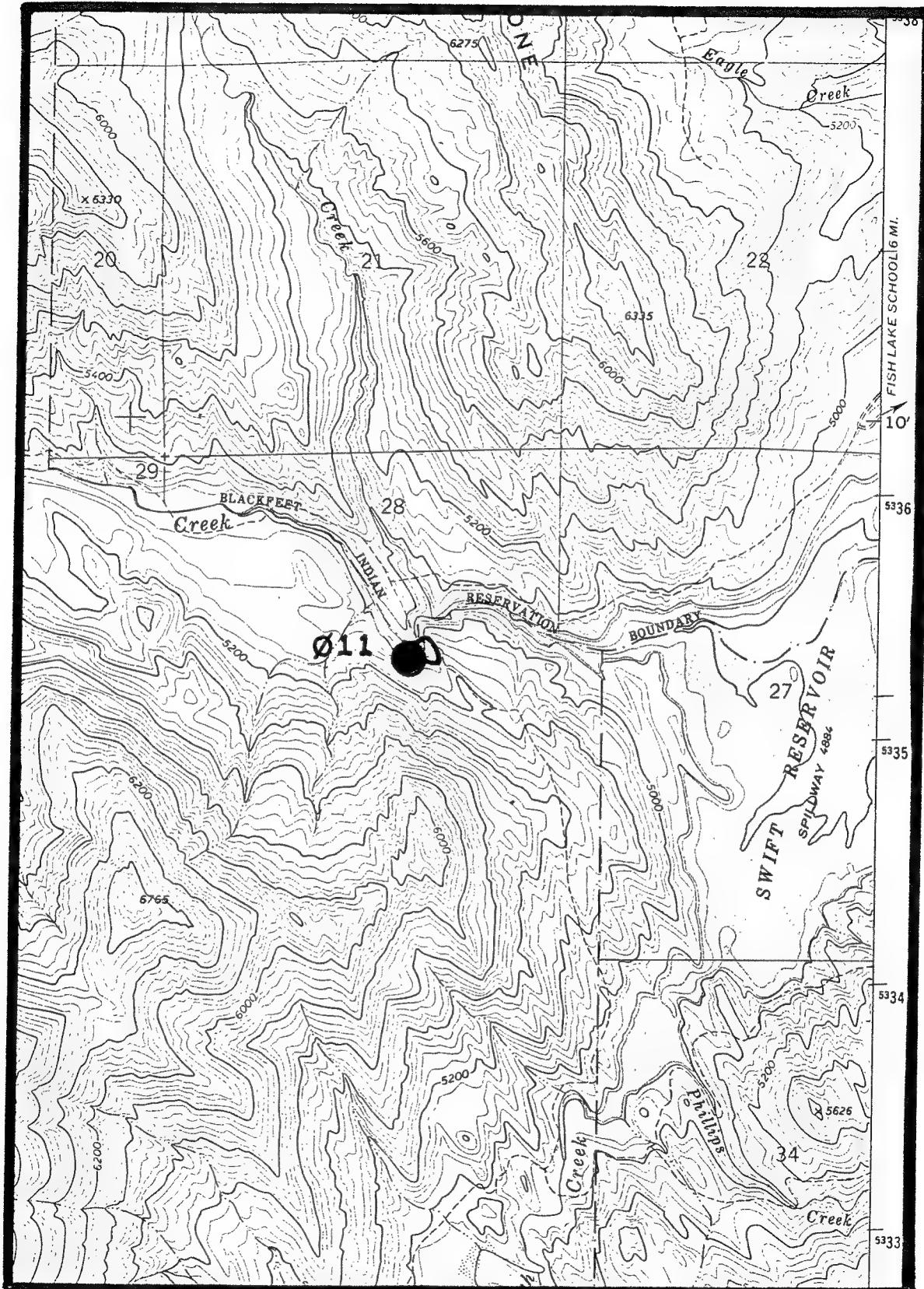












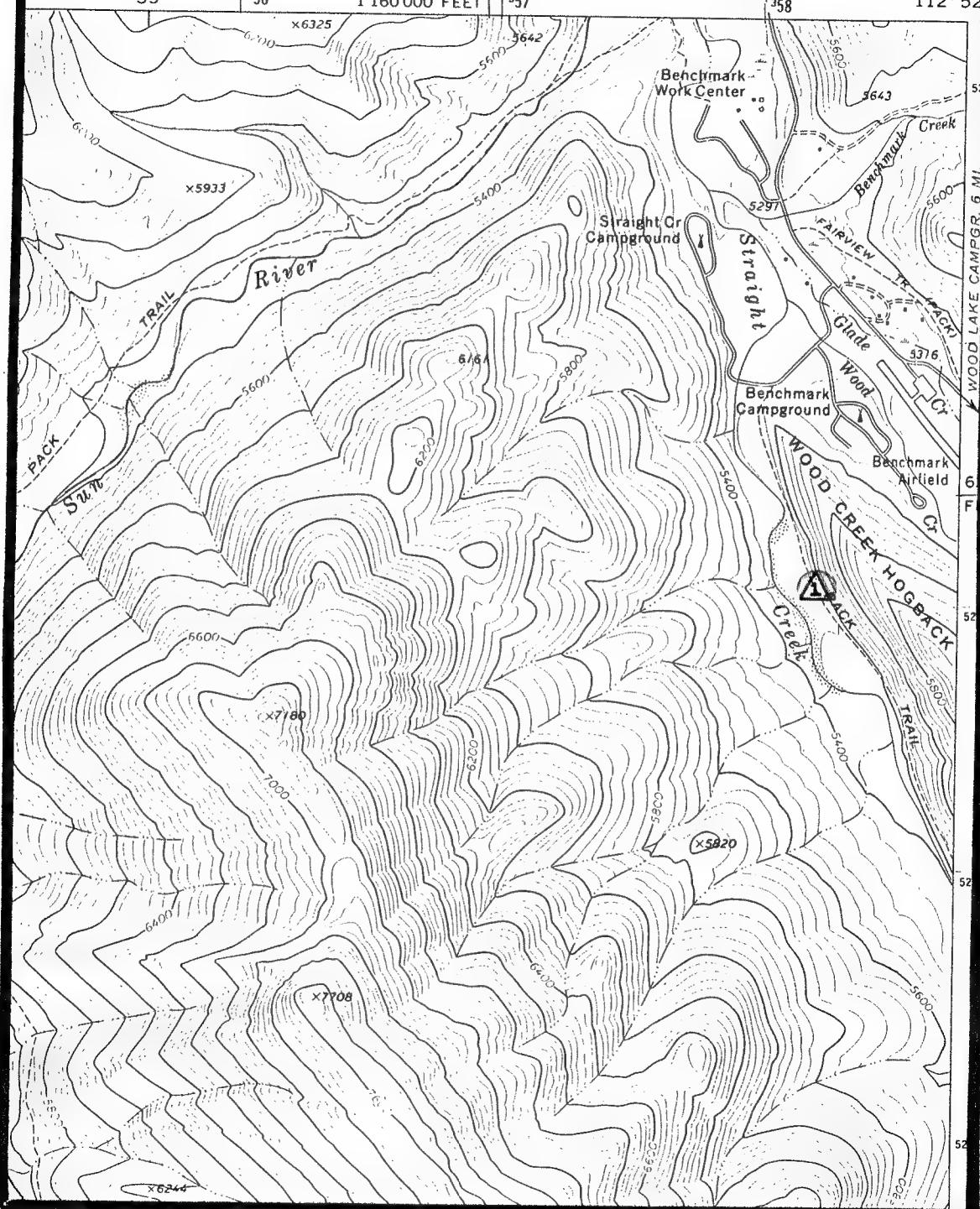
BENCHMARK QUADRANGLE
MONTANA—LEWIS AND CLARK CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

PRETTY PRAIRIE GUARD STA. 6 MI.

55' 356

1 160 000 FEET 357

112° 52'



STATUS REVIEW OF Cypripedium passerinum

U.S. FOREST SERVICE - REGION 1

FLATHEAD AND LEWIS & CLARK NATIONAL FORESTS

MONTANA

Prepared by:

J. Stephen Shelly, Botanist
Montana Natural Heritage Program
State Library Building
1515 E. 6th Avenue
Helena, MT 59620

Order No. 40-03K0-8-238

December 1988

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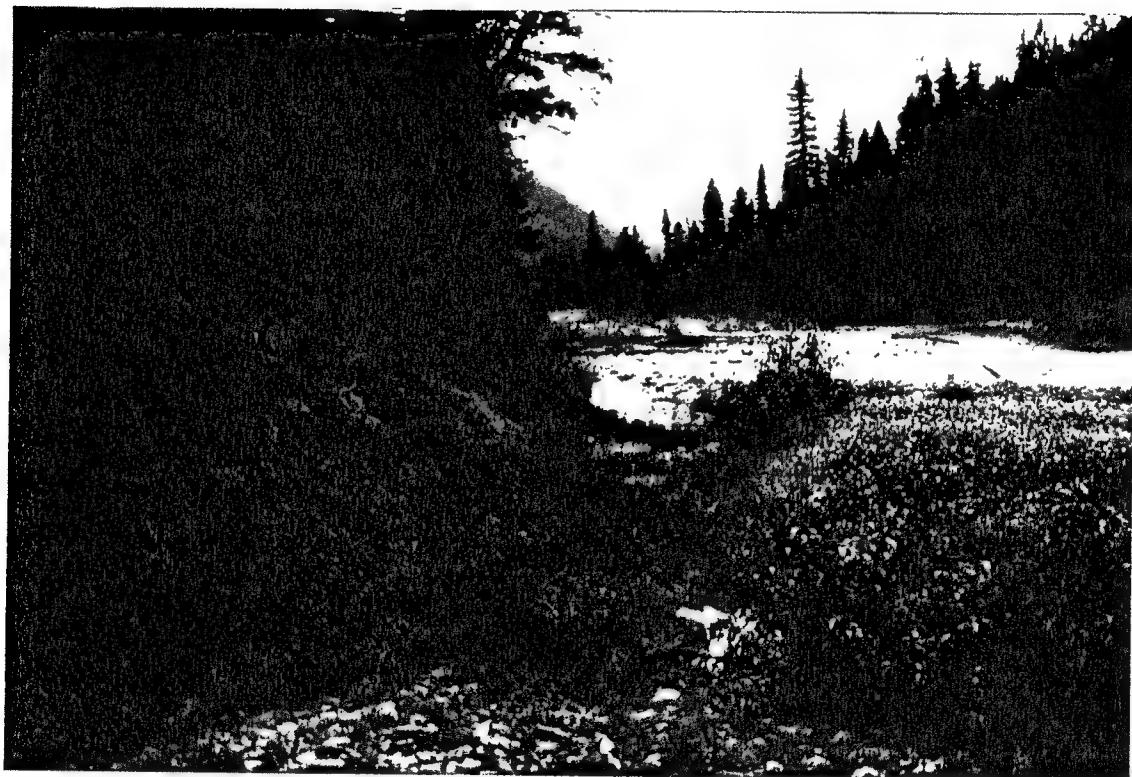
December 1988



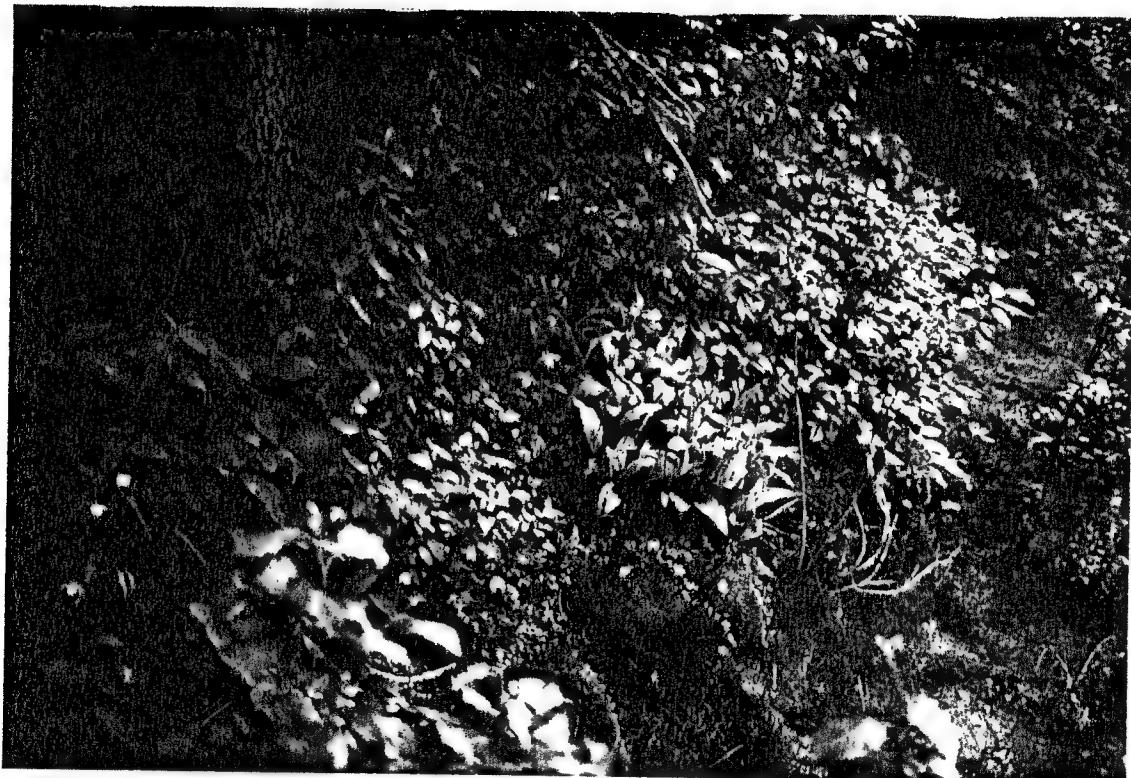
A. *Cypripedium passerinum* - cluster of flowering stems (White River (004) site).



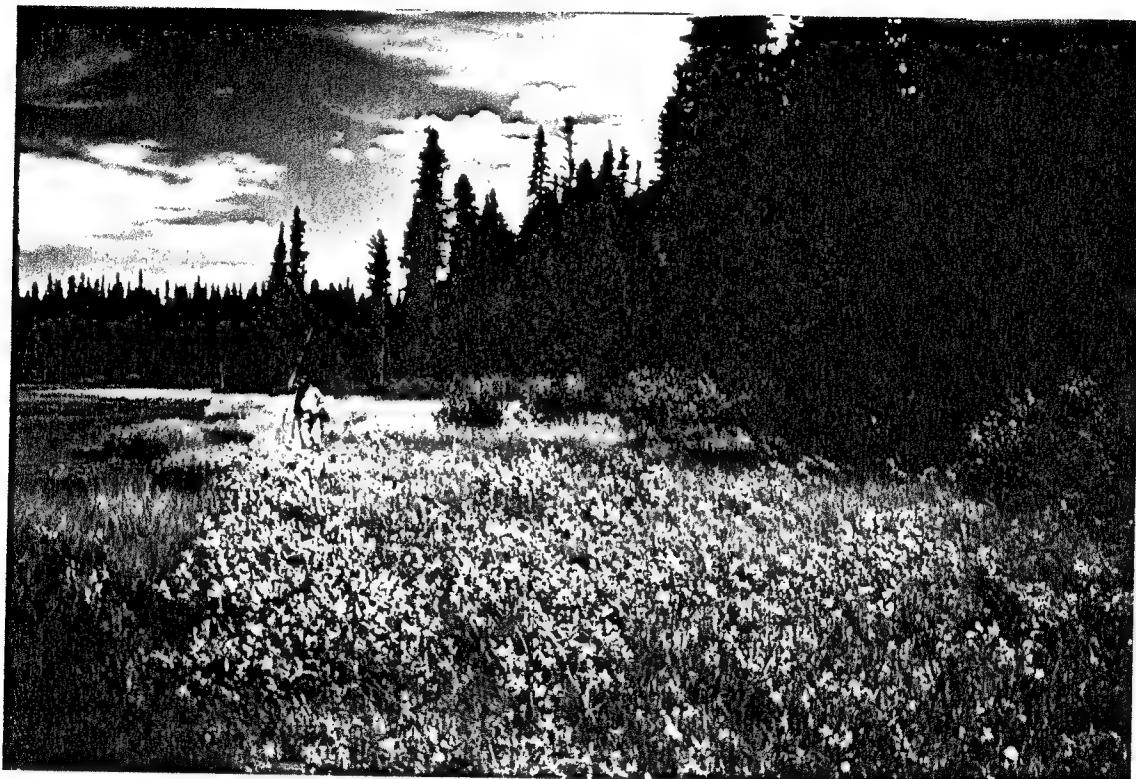
B. Cypripedium passerinum - flowering stem (Mud Lake (005) site).



C. Cypripedium passerinum - habitat along the White River (004); species occurs in low moist area in left foreground, and along forest margin.



D. Cypripedium passerinum - ecotonal habitat along the White River (004).



E. Cypripedium passerinum - bog meadow on east edge of Mud Lake (005); population occurs in ecotone with forests on the right. Angela Evenden walking in the meadow.



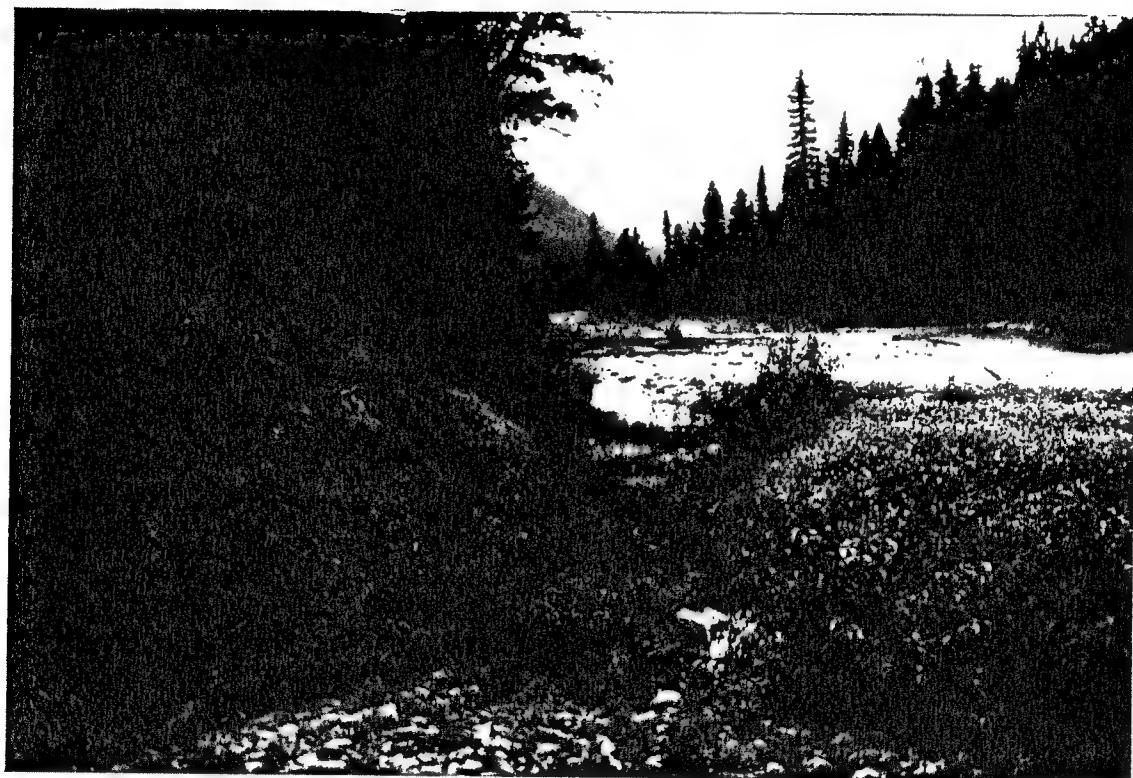
F. Cypripedium passerinum - ecotonal habitat near east side of Mud Lake (005).



A. Cypripedium passerinum - cluster of flowering stems (White River (004) site).



B. Cypripedium passerinum - flowering stem (Mud Lake (005) site).



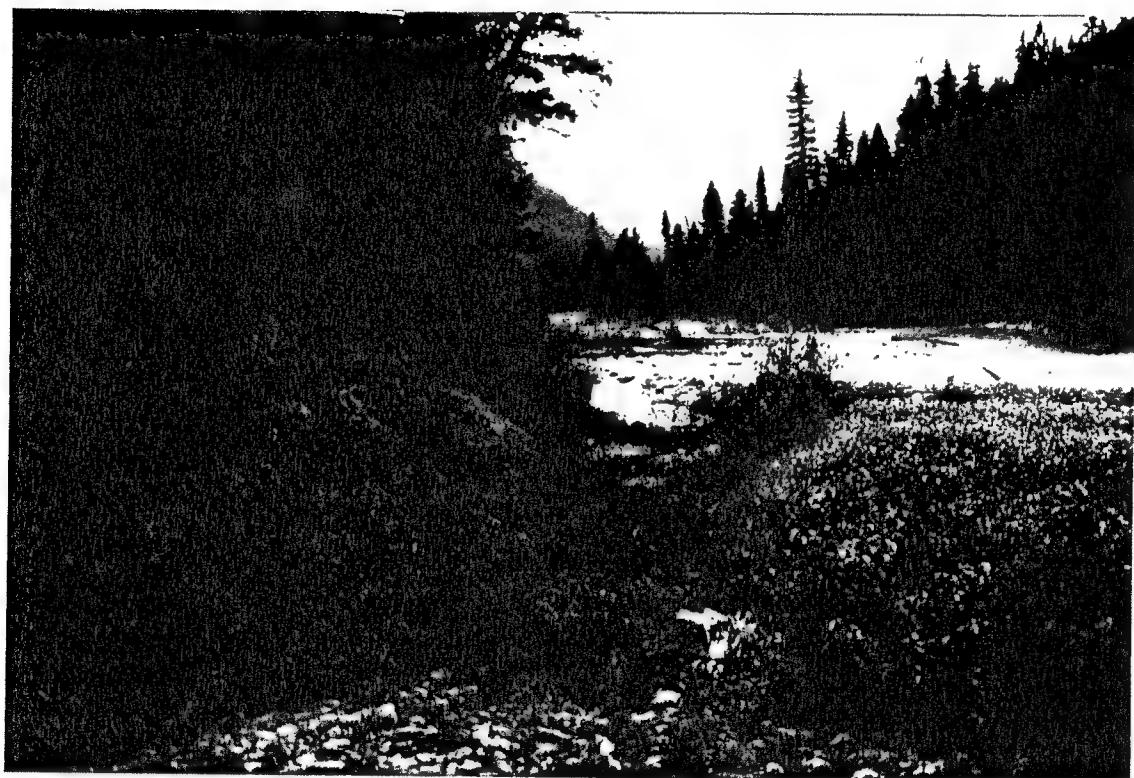
C. Cypripedium passerinum - habitat along the White River (004); species occurs in low moist area in left foreground, and along forest margin.



A. Cypripedium passerinum - cluster of flowering stems (White River (004) site).



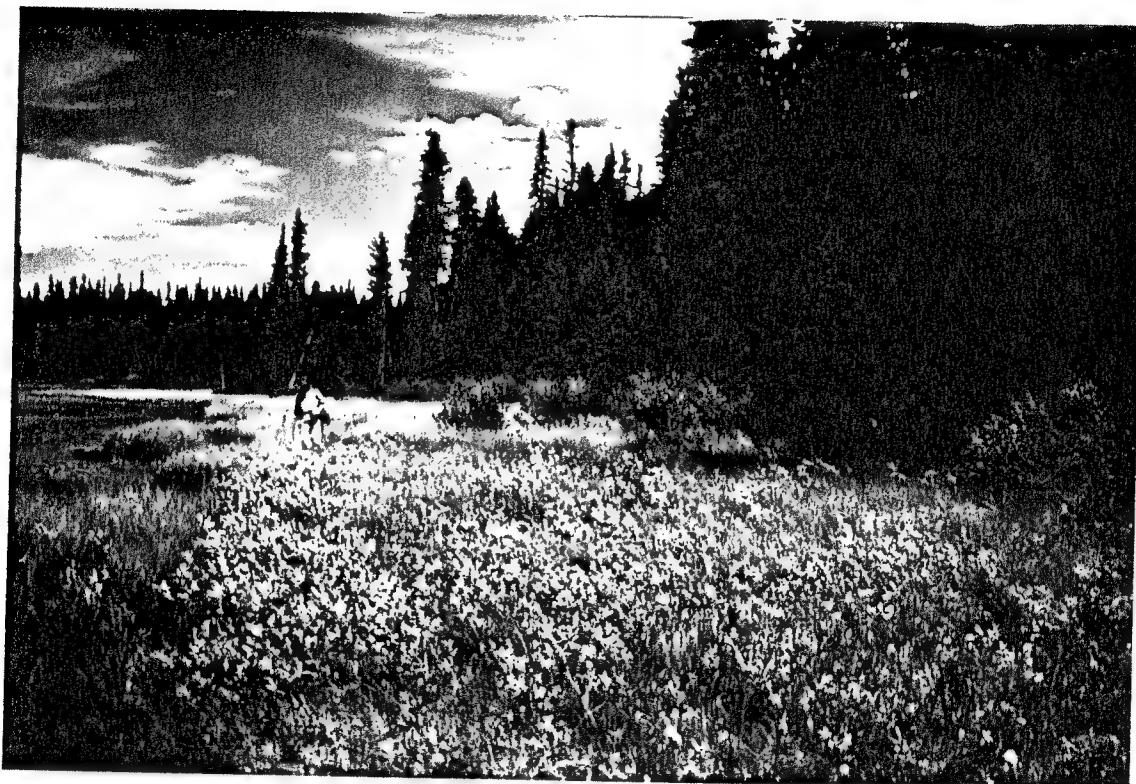
B. Cypripedium passerinum - flowering stem (Mud Lake (005) site).



C. *Cypripedium passerinum* - habitat along the White River (004); species occurs in low moist area in left foreground, and along forest margin.



D. Cypripedium passerinum - ecotonal habitat along the White River (004).



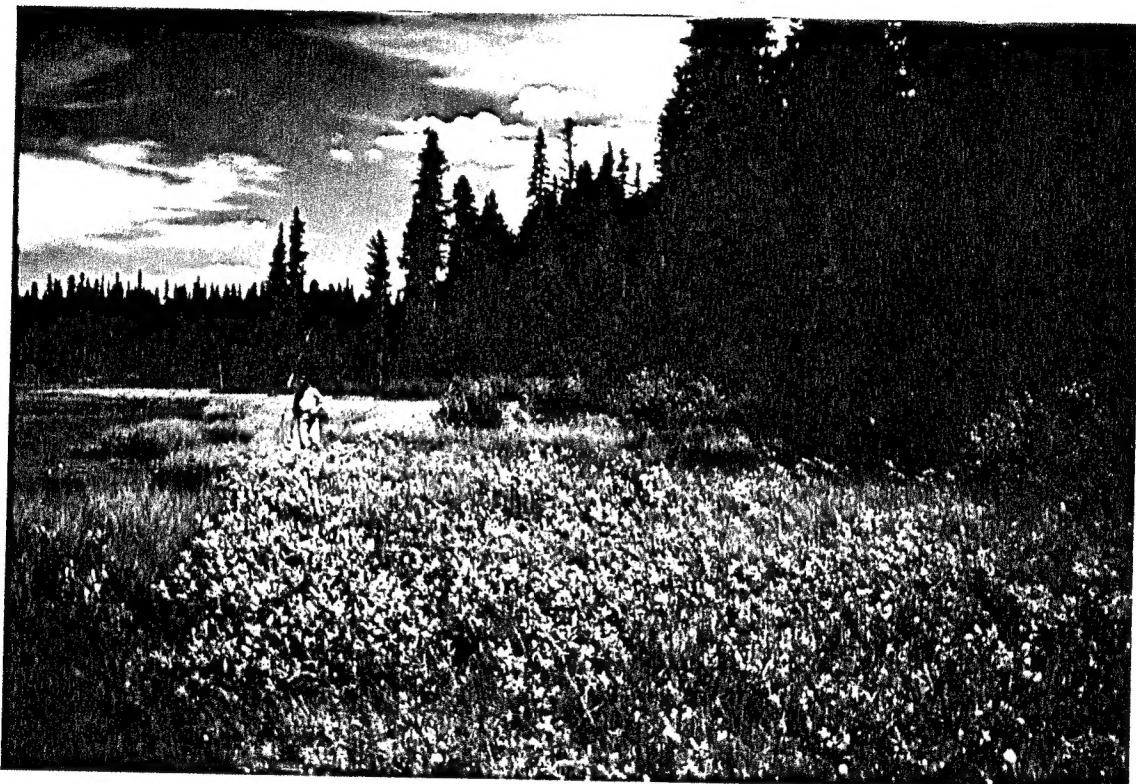
E. Cypripedium passerinum - bog meadow on east edge of Mud Lake (005); population occurs in ecotone with forests on the right. Angela Evenden walking in the meadow.



F. Cypripedium passerinum - ecotonal habitat near east side of Mud Lake (005).



D. Cypripedium passerinum - ecotonal habitat along the White River (004).



E. Cypripedium passerinum - bog meadow on east edge of Mud Lake (005); population occurs in ecotone with forests on the right. Angela Evenden walking in the meadow.



F. Cypripedium passerinum - ecotonal habitat near east side of Mud Lake (005).